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SAN FRANCISCO BICYCLE PLAN

2004

SEPTEMBER 2004

PREPARED FOR:

SAN FRANCISCO DPT DEPARTMENT OF PARKING & TRAFFIC

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

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EXECUTIVE SUMMARY

BICYCLING FOR THE FUTURE

Major infrastructure and programmatic improvements have taken place since the Bike Plan was first developed in 1997. Miles of new bike lanes have been striped; hundreds of bike racks have been installed; the number of bicycle commuters has more than doubled from 1990 to 2000[i]; while the number of bicyclist injury collisions has decreased.[ii]

The recognition of bicycles as a key component of a sustainable transportation system has permeated local and regional governments and funding agencies. Popular bicycling corridors such as Valencia Street show a more than doubling in bicycle traffic along that street once bike lanes were striped. The passage of Proposition K (the extension of the half-cent local transportation sales tax) in 2003 provides a historic opportunity to systemically upgrade and expand San Francisco's bicycle facilities.

With San Francisco's temperate climate, attractive neighborhoods, limited parking, and compact geography, there is an enormous potential to encourage more people to bicycle: for errands, work, school, or fun.

This updated Bike Plan contains a framework to shape San Francisco into a world-class bicycling city. By investing in bicycle facilities and education; and by implementing innovative policies and programs, we can provide San Franciscans more viable options for mobility. To achieve another major increase in the number of people using the bicycle as transportation, all Action items included in this Bike Plan must be implemented within the next five years. This will require strong leadership from local elected officials, cooperation between a host of city agencies, and an unwavering commitment on the goals contained herein.

SUMMARY OF GOALS, OBJECTIVES AND ACTIONS

The following section presents overall San Francisco Bicycle Plan project goals developed by this project's Technical Advisory Committee and Oversight Committee. These goals, objectives and action items provide key staff, agencies, and local elected officials with direction on the necessary steps required to improve San Francisco for bicyclists.

1. SAN FRANCISCO BICYCLE PLAN OVERALL GOALS AND VISION

OVERALL GOAL:

Make bicycling an integral part of daily life in San Francisco.

PLAN GOALS

1. ***INCREASE SAFE BICYCLE USE***
2. ***REFINE AND EXPAND THE EXISTING BICYCLE ROUTE NETWORK***
3. ***ENSURE PLENTIFUL, HIGH-QUALITY BICYCLE PARKING TO COMPLEMENT THE BICYCLE ROUTE NETWORK***
4. ***ADOPT BICYCLE-FRIENDLY PRACTICES AND POLICIES***
5. ***PROMOTE SAFE BICYCLING***
6. ***INCREASE ENFORCEMENT OF BICYCLE-RELATED VIOLATIONS***
7. ***PRIORITIZE AND INCREASE BICYCLE FUNDING***

1. INTRODUCTION GOALS, OBJECTIVES

The Introduction describes the two major parts of the 2004 Bicycle Plan Update: the Policy Framework and the Network Improvement Document. The chapter continues with an introduction to San Francisco land use, demographics: the overall planning process for this Plan; agency responsibility for plan implementation; and, funding.

Goal:
Make bicycling an integral part of daily life in San Francisco.

Objectives:

- Increase Safe Bicycle Use
  - Triple the daily bicycle trips in San Francisco to "10 percent by 2010"iii; and
  - Reduce the rate of bicycle-motor vehicle collisions as bicycle usage increases;

- Identify and pursue new and existing local, regional, state, and federal funding sources for bicycle facilities and education and promotion programs.

2. BICYCLE ROUTE NETWORK GOALS, OBJECTIVES AND ACTION ITEMS

The Bicycle Route Network Chapter provides an overview of recommended improvements to the citywide Bicycle Route Network, a discussion of facility types, and a summary of the Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT)-adopted Supplemental Design Guidelines to the Plan (that provide new design standards for bicycle facilities). Chapter 2 sets the stage for implementation of specific project improvements and outlines potential projects to be further defined in the Network Improvement Document.

Goal:
Refine and Expand the Existing Bicycle Route Network

Objectives:

- Provide safe space for bicyclists through a comprehensive network of bikeways that are appropriately signed, marked, and/or traffic-calmed. Ideally, the facilities would include on-street routes, marked bicycle lanes, and off-street bicycle paths;
- Utilize innovative designs, where appropriate, to improve bicycle usage and safety; and
- Ensure the Bicycle Route Network:
  - allows bicycle access within a quarter mile of major commercial and residential areas;
  - provides access to all San Francisco Municipal Railway (Muni) metros, Bay Area Rapid Transit (BART), and Caltrain stations; and ferry terminals and other major transit hubs; and,
  - is well signed.

Action 2.1
Complete the Bicycle Plan: Network Improvement Document.

Action 2.2
Update the Official Bicycle Route Network Map to reflect route relocations, and periodically update the Bicycle Route Network identified within the San Francisco General Plan.

Action 2.3
Complete the required design and engineering for improvements to Recommended Study Streets and implement, if feasible and according to the Department of Public Works (DPW)'s Five Year Proposed Paving Plan.

Action 2.4
Implement the Transit First Policy's bicycle and transit elements.

Action 2.5
Select a new or a modified exclusive bus lane to conduct a before and after study, in conjunction with Muni, to allow bicycles.

Action 2.6
Amend Traffic Code Section 31 to allow bicyclists in exclusive bus lanes, when they are right curb lanes; except on one-way streets.

Action 2.7
Review multi-lane streets that currently have excess capacity (i.e. less than 600 vehicles per lane per hour during the peak-hour). The removal of a travel lane due to excess capacity could assist in accommodating bicycle lanes or other bicycle-friendly treatments.

Action 2.8
Adopt the San Francisco County Transportation Authority (SFCTA) technical working group's recommend revisions to San Francisco's level of service (LOS) standards and methodologies such that they better respond to the multimodal nature of San Francisco's transportation system, specifically addressing bicycles.

Action 2.9
Define and identify "bicycle arterial streets," conduct public outreach, and seek a Municipal Transportation Agency (MTA) policy decision to modify the Traffic Calming Guidelines.

Action 2.10
Implement Supplemental Design Guidelines on specific Recommended Network Improvement projects with the appropriate level of analysis and study.

Action 2.11
Prioritize phased application of the Shared-Use Pavement Arrow on appropriate existing signed bicycle routes, wide curb lanes, and newly designated routes where bicycle lane implementation is demonstrated to be infeasible.

Action 2.12
Develop and enforce a set of standards that must be strictly adhered to by contractors for street excavation restoration, including a guarantee of one year for replacement of any defective work.

Action 2.13
Amend DPW's guidelines to allow acceptance of a City street due to its inclusion on the Bicycle Route Network, subject to Board of Supervisor approval.

Action 2.14
Create a prioritized bicycle pathway inventory that would include: surface condition of every path within the City; signing and lighting inventory and needs of paths; and respective agency responsible for the maintenance of a path.

Action 2.15
Maintain a minimum of a weekly sweeping schedule (DPW and the Recreation and Park Department) - especially for off-street paths that are not currently cleaned on a regular schedule - in addition to sweeping bikeways whenever there is an accumulation of gravel, glass, sand, etc.

Action 2.16
Increase the profile of the Bicycle Route Network within DPW's street resurfacing and paving prioritization process.

Action 2.17
Create an inventory of locations along the Bicycle Route Network that intersect or run parallel to railroad tracks. Appropriate measures should be undertaken to mitigate the impacts of the track crossings to bicyclists. Removal of unused tracks along the Bicycle Route Network should also be undertaken.

3. BICYCLE PARKING GOALS, OBJECTIVES AND ACTION ITEMS

The Bicycle Parking Chapter provides an overview of the existing Planning Code governing provision of bicycle parking for public and private buildings and garages and recommends improvements for administration and enforcement, as well as providing new guidelines for implementation of bicycle parking throughout the City.

Goal:

Ensure Plentiful, High-Quality Bicycle Parking to Complement the Bicycle Route Network

Objectives:

- Provide secure short-term and long-term bicycle parking, including support for bike stations and attended bicycle parking facilities at major events and destinations; and

- Provide current and relevant information to cyclists regarding bicycle parking opportunities through a variety of formats.

Action 3.1
Consolidate Sections 155.1, 155.2, 155.3, and 155.4 of the Planning Code to provide clearer regulation, guidance and exemptions related to bicycle parking.

Action 3.2
Modify the Planning Department's requirements for bicycle parking so that they are less dependent on automobile parking provisions.

Action 3.3
Amend the Planning Code to increase required bicycle parking for new residential developments and base this requirement on a proportion of dwelling units.

Action 3.4
Ensure that all garage bicycle parking is well advertised at their respective bicycle entrances, and that they are well monitored and secure.

Action 3.5
Increase, through additional staff resources, the Planning Department's monitoring and enforcement of bicycle parking provisions in the Planning Code, especially when issuing building permits.

Action 3.6
Hold meetings as needed between the Department of Parking and Traffic (DPT) Bicycle Program and Planning Department staff to update citywide bicycle-parking compliance status and review bicycle-parking information posted on the Bicycle Program website.

Action 3.7
Conduct DPT's bicycle-parking training for new Planning Department personnel as needed.

Action 3.8
Ensure that all City leases are negotiated to include the required level of bicycle parking by cooperative efforts of the City Real Estate Department and the DPT Bicycle Program.

Action 3.9
Pursue a citywide policy to provide secure bicycle parking at all City buildings in areas to be specified by the individual agencies, subject to safety regulations and available space, by cooperative efforts of the City Real Estate Department and the DPT Bicycle Program.

Action 3.10
Amend the Planning Code to lower the number of automobile parking spaces required in buildings where Class I bicycle parking is provided.

Action 3.11
Amend the Planning Code to require bicycle-parking in each individual building of large, multiple-building developments.

Action 3.12
Amend the Planning Code to allow tenants to bring their bicycles into buildings unless Class I bicycle-parking is provided.

Action 3.13

Prepare additional guidelines for placement and design of bicycle parking within City rights-of-way, with DPT Bicycle Program, Planning Department, and Department of Public Works (DPW) input. Consider curb-side on-street bicycle parking, and "sleeve" ring racks where inverted "U" racks cannot be accommodated.

Action 3.14

Develop and maintain a DPT, City-distributed, bicycle-parking outreach campaign in print, audio-visual, and web-based formats to provide relevant bicycle-parking information such as garage locations and locker availability.

Action 3.15

Work with the San Francisco Police Department (SFPD) to make bicycle theft investigation a higher priority and to create a better system for returning recovered bicycles to their owners.

4. TRANSIT AND BRIDGE ACCESS GOALS, OBJECTIVES AND ACTION ITEMS

The Transit and Bridge Access Chapter addresses the linkages between bicycle trips and transit service, as well as bicycle access to local and regional bridges. By improving bicycle access to transit vehicles and stations, many opportunities are created for increased bicycle trips. This chapter contains recommendations for creating greater bicycle access to Muni and other transit agencies' vehicles and to existing and future transit stops and stations.

Goal:

Expand Bicycle Access to Transit and Bridges

Objectives:

- Provide bicycle access to transit vehicles whenever feasible;
- Provide convenient bicycle access and bicycle parking at transit stations; and
- Provide bicycle access to all bridges whenever feasible.

Action 4.1

Create a Muni policy that explicitly permits folded bicycles on all San Francisco Municipal Railway (Muni) vehicles.

Action 4.2

Develop a pilot program to provide bicycle access on light rail vehicles for a trial period.

Action 4.3

Update Muni bicycle accessibility guidelines and widely distribute and publicize these guidelines.

Action 4.4

Work with Bay Area Rapid Transit (BART) to analyze existing policy, identify expanded bicycle-access times, and create a trial program for non-folding bicycle access in both directions on Transbay peak period trains.

Action 4.5

Work with Caltrain, which is a major commuter connection to downtown San Francisco, to expand bicycle access on its fastest service "Baby Bullet" trains.

Action 4.6

Ensure that all San Francisco transit stations, including the new Transbay Terminal, provide barrier-free bicycle access and state-of-the-art bicycle parking facilities.

Action 4.7
Work with San Francisco Bay Area transit operators and the Metropolitan Transportation Commission (MTC) to develop, implement, maintain, expand, and enforce improved inter-modal bicycle access.

Action 4.8
Promote bicycle parking "stations" at transit hubs that provide secure, monitored bicycle parking, commuter information, and bicycle maintenance services.

Action 4.9
Allow cyclists with disabled bicycles (due to mechanical failure or collision) to bring them on Muni vehicles, interior space permitting and at the vehicle operator's discretion, when the Muni vehicle either does not have bicycle racks or have racks that are full.

Action 4.10
Install bicycle racks on all Muni-operated buses, and all other transit buses operating in San Francisco, including the 45-foot Golden Gate Transit equipment.

Action 4.11
Work with the California Department of Transportation (Caltrans) and the Golden Gate Bridge, Highway and Transportation District (GGBHTD) to provide improved bicycle access to and upon all San Francisco bridges, including the design and building of a multi-use path on the west span of the Bay Bridge.

Action 4.12
Work with Caltrans and the MTC in continued studies of the Bay Bridge pathway to ensure that such a facility integrates with San Francisco's on-street bicycle facilities in a manner that is safe and convenient for bicycle commuter and recreational cyclists.

5. EDUCATION GOALS, OBJECTIVES AND ACTION ITEMS
The Education Chapter provides an overview of the City's bicycle educational outreach efforts. It recommends creating a comprehensive set of general and targeted DPT cycling safety classes and workshops. The Education Chapter addresses several aspects of bicycle safety for bicyclists, motorists, and City staff to ensure that all parties are aware of cyclists' rights and responsibilities.

Goal:
Educate the general public and targeted population about bicycle safety.

Objectives:

- Create, fund, and implement official Department of Parking and Traffic (DPT) bicycle-safety curricula to the general public and targeted populations.
- Create, fund, and implement DPT bicycle-safety outreach campaigns for motorists, bicyclists, and the general public.

Action 5.1
Provide DPT bicycle-safety information to diverse age, income, and ethnic populations.

Action 5.2
Provide DPT bicycle-safety information in languages that are widely used within San Francisco such as Spanish and Cantonese.

Action 5.3
Partner with other agencies, where appropriate, to distribute DPT

bicycle-safety education materials in mass mailings.

Action 5.4
Create a web-based bicycle education traffic school curriculum as an option in lieu of other pecuniary penalties for traffic law violators.

Action 5.5
Increase DPT participation in Bike to Work Day activities by providing resources and materials as staff availability and funding allow.

Action 5.6
Implement new outreach campaigns for improved bicycle facilities, especially those located on the Bicycle Route Network.

Action 5.7
Develop DPT bicycle-safety classes for City Employees.

Action 5.8
Develop a DPT bicycle-safety workshop for transit operators and other large fleet-vehicle operators.

Action 5.9
Develop bicycle-safety curricula for use in the San Francisco Unified School District (SFUSD) and San Francisco public colleges.

Action 5.10
Periodically evaluate and adjust, where appropriate, DPT's bicycle-safety program.

6. ENFORCEMENT AND SAFETY GOALS, OBJECTIVES AND ACTION ITEMS

The Enforcement and Safety Chapter summarizes existing traffic violations and collisions involving bicyclists and makes recommendations for improved enforcement. To improve safety for bicyclists throughout the City, the recommendations focus actions related to both motor vehicle and bicycle traffic violations.

Goal:
Improve bicycle safety through targeted enforcement of moving violations.

Objectives:

- Increase San Francisco Police Department (SFPD) enforcement of motorist and cyclist traffic violations that pose the greatest threat to safety;
- Provide Department of Parking and Traffic (DPT) bicycle safety education to police and those cited for moving violations that focuses on safe cycling, relevant traffic laws, and safe sharing of the roadway; and,
- Increase SFPD enforcement of motorist violations in bicycle facilities, including additional patrols of bike lanes to address double parking.

Action 6.1
Place a high priority on SFPD enforcement of both bicyclist and motorist violations that most frequently injure cyclists.

Action 6.2
Develop a SFPD "fix-it ticket" program, in collaboration with the DPT, for bicycle equipment violations.

Action 6.3
Develop a method at the SFPD to systematically share non-collision bicyclist citations with DPT Bicycle Program.

Action 6.4
Develop and implement, in collaboration with the SFPD, a DPT bicycle-safety traffic school curriculum as an option for those cited for moving violations.

Action 6.5
Request that the California Bicycle Coalition work to change California Vehicle Code (CVC) 21754 (Passing on the right) so that it applies to bicycles.

Action 6.6
Clarify sections of the San Francisco Traffic Code that pertain to double parking in bicycle lanes and increase parking enforcement and fines for this violation.

Action 6.7
Post "no parking in bike lane" signs along bicycle lanes where double parking occurs.

Action 6.8
Increase the enforcement of motorcycles operating in bike lanes.

Action 6.9
Develop a DPT bicycle-safety curriculum for all SFPD police officers that focuses the rights and responsibilities of bicycle traffic and techniques required for safe and legal sharing of the roadway.

Action 6.10
Increase SFPD and DPT bicycle-mounted patrols.

Action 6.11
Develop a system for hospitals, emergency rooms, and clinics to report all instances of bicycle injury to the SFPD and to the DPT Bicycle Program Manager.

Action 6.12
Implement a system to allow cyclists to report collisions directly to the Bicycle Program website.

Action 6.13
Inform cyclists that they are legally entitled to file a collision report, if one is not initiated by the police.

Action 6.14
Develop a standardized procedure for reporting San Francisco Municipal Railway (Muni) bicycle-related incidents and make this information more transparently available to the Bicycle Program.

7. PROMOTION GOALS, OBJECTIVES AND ACTION ITEMS

The Promotion Chapter focuses on attracting new bicyclists to the streets of San Francisco, keeping existing bicyclists on the road, and generally promoting awareness of the benefits that increased bicycle usage holds for the City.

Goal:
Promote Safe Bicycling and Safe Bicycling Practices.

Objectives:
- Through community partnerships, identify funding, develop, and implement bicycle media campaigns and promotional materials to promote bicycling as a safe, healthy, cost-effective, environmentally beneficial transportation choice; and
- Target promotional materials to San Francisco's diverse population groups.

Action 7.1
Promote the benefits of the Bicycle Route Network facilities to diverse age, income, and ethnic populations.

Action 7.2
Formalize bicycle education and promotion responsibilities and develop partnership agreements between the Department of Parking and Traffic (DPT) Bicycle Program; the Department of the Environment (SF Environment); the Department of Public Health (DPH); and other City agencies.

Action 7.3
Expand bicycle promotion and incentive programs for City employees to serve as a model program for other San Francisco employers.

Action 7.4
Include, where appropriate, telephone and web-based contact information for the Metropolitan Transportation Commission (MTC)'s "511" program on relevant DPT Bicycle Program materials.

Action 7.5
Encourage and promote bicycle related businesses within San Francisco.

8. GENERAL PLAN AMENDMENTS, ENVIRONMENTAL REVIEW, AND CITYWIDE COORDINATION GOALS, OBJECTIVES, AND ACTION ITEMS

The General Plan Amendments, Environmental Review, and Citywide Coordination Chapter address many elements that are relevant to bicycle policy consistency. This chapter focuses on recommended modifications to the General Plan's Transportation Element, Downtown Area Plan, and to the city's environmental review guidelines.

Goal:
Adopt Bicycle-Friendly Practices and Policies

Objective:
Integrate consideration of bicycle travel into all roadway planning, design, and construction.

Action 8.1
Incorporate this Bicycle Plan in whole by reference into the General Plan and amend sections of the General Plan that are relevant to bicycling, including the Transportation Element and Downtown Area Plan, according to the goals of the Bicycle Plan.

Action 8.2
Adhere to the process for General Plan amendments as required for subsequent amendments and updates to the Bicycle Plan and Bicycle Route Network.

Action 8.3
Ensure that all current and proposed Area Plans' objectives and policies are consistent with the goals of the San Francisco Bicycle Plan. Whenever updates or revisions are considered to existing Area Plans, especially those that do not now contain sections on bicycling, these Area Plans should include sections on bicycling consistent with the goals of the Bicycle Plan. These current Area Plans include: Central Waterfront, Chinatown, Civic Center, Rincon Hill, and South of Market.

Action 8.4

Update the Planning Department's "Guidelines for Environmental Review: Transportation Impacts," to ensure adequate accommodation of bicycles.

Action 8.5

Ensure that non-automated traffic counts conducted as part of any City transportation or development study include: bicycle counts at the same locations where motor vehicles are counted; an inventory of existing bicycle parking within a two-block radius of the study site; and the project's impacts on any existing or proposed bikeways designated in the General Plan.

Action 8.6

Consult DPT regarding any proposed bicycle facilities, namely public agencies with jurisdictions or rights-of-way within the City and County of San Francisco.

i If the non-commuting (working at home)inhabitants of San Francisco are included, the percentage would be 1.9%, while if the non-commuting population is not included, the mode share for those commuting to work by bicycle would be 2.1%

ii Chapter 6 details bicyclist injury collisions

iii It should be noted that the estimate of bicycle mode share must take into account variations in data acquisition methodologies, percentage variation, range of acceptable error, and periodic variations. A distinction should be made that tripling all trips by bicycle, and not just commute work trips, is the stated vision. The most accurate data collected at the national level is the U.S. Census data for trips to work. This does not account for recreational bicycle trips, bicycle trips made by children, and general utilitarian bicycle trips for everyday transportation needs. If these trips were included within the total mode share for bicycle use, the overall percentage of use would be higher. A 1997 local telephone survey of registered San Francisco voters suggested a number of 3.7% of commute trips to work. However this was only one survey in 1997, with a sample population of 600 registered voters. The San Francisco Bicycle Coalition's byline "10% by 2010" is based on this 1997 survey.

1. INTRODUCTION

Goal:

Make bicycling an integral part of daily life in San Francisco.

Objectives:

- Increase Safe Bicycle Use:
  - Triple the daily bicycle trips in San Francisco to "10 percent by 2010"[1]; and
  - Reduce the rate of bicycle-motor vehicle collisions as bicycle usage increases;
- Identify and pursue new and existing local, regional, state, and federal funding sources for bicycle facilities and education and promotion program.

SAN FRANCISCO'S COMMITMENT TO BICYCLING

Bicycling is a clean, economical, and healthy transportation mode for San Francisco. Since the late-nineteenth century, people have ridden bicycles here. With its temperate climate, attractive neighborhoods, limited parking, mixed land-uses, and compact geography, San Francisco continues to attract a diverse group of cyclists: commuters, shoppers, recreational riders, and tourists. The City is also home to a diverse, dynamic bicycle culture; a large, active advocacy group, the San Francisco Bicycle Coalition (SFBC); and an established Bicycle Advisory Committee (BAC) appointed by the Board of Supervisors (BOS).

This chapter introduces San Francisco's characteristic bicycling environment, the City's transportation policy framework, the Plan's public participation process, and the goals and objectives guiding the development of the Plan.

Emperor Norton II riding a "boneshaker" in San Francisco.

1 It should be noted that the estimate of bicycle mode share must take into account variations in data acquisition methodologies, percentage variation, range of acceptable error, and periodic variations. A distinction should be made that tripling all trips by bicycle, and not just commute work trips, is the stated vision. The most accurate data collected at the national level is the U.S. Census data for trips to work. This does not account for recreational bicycle trips, bicycle trips made by children, and general utilitarian bicycle trips for everyday transportation needs. If these trips were included within the total mode share for bicycle use, the overall percentage of use would be higher. A 1997 local telephone survey of registered San Francisco voters suggested a number of 3.7% of commute trips to work. However this was only one survey in 1997, with a sample population of 600 registered voters. The San Francisco Bicycle Coalition's byline "10% by 2010" is based on this 1997 survey.

PLAN DEVELOPMENT AND IMPLEMENTATION

The SF Bike Plan Policy Framework was developed with considerable input from the SFBAC; the SFBC; numerous City departments and agencies; and the Department of Parking and Traffic (DPT). The San Francisco County Transportation Authority (SFCTA) – Prop K sales tax, California's Transportation Development ACT (TDA) Article 3, and California Department of Transportation (Caltrans) provided substantial funding to develop this Plan and conduct public outreach.

The Plan is also based upon a significant amount of public input and thorough review by a broad-based Technical Advisory Committee (TAC) comprised of representatives from many City departments and regional agencies with an interest and responsibility in the recommendations and outcome of the Plan, as well as community members. The role of this TAC is to advise DPT and its consultants, Alta Planning + Design, on technical matters that would impact and influence their respective departments and agencies. TAC members are also responsible to serve as liaisons with their respective departments or agencies to get additional feedback, comments, or support.

The Technical Advisory Committee members are listed below:

- Association of Bay Area Governments - Bay Trail (ABAG)
- Bay Area Air Quality Management District (BAAQMD)
- Bay Area Rapid Transit (BART)
- Department of Public Works (DPW)
- Golden Gate Park Concourse Authority
- National Park Service
- Planning Department
- Police Department
- Port of San Francisco
- Presidio Trust of San Francisco
- Recreation and Park Dept.
- Redevelopment Agency
- SF Bicycle Advisory Committee (BAC)
- SF Bicycle Coalition (SFBC)
- SF County Transportation Authority (SFCTA)
- SF Department of Parking & Traffic (DPT)
- SF Fire Department
- SF Municipal Railway (Capital Planning)
- SF Municipal Railway (Service Planning)
- Treasure Island Development Authority

In addition to the TAC, the Bicycle Plan Update also has an Oversight Committee (OC). The role of this committee is to provide general oversight and guidance on the vision, goals, and objectives of the overall bicycle planning process. The OC members are listed below:

- Office of the Mayor
- Planning Department
- SF Bicycle Advisory Committee (BAC)

- SF Bicycle Coalition (SFBC)
- SF County Transportation Authority (SFCTA)
- SF Department of Parking & Traffic (DPT)
- SF Municipal Railway (Capital Planning)
- Transportation for a Livable City (TLC)

THE BICYCLE PLAN: POLICY FRAMEWORK AND NETWORK IMPROVEMENT

There are two major parts to the Bicycle Plan Update: the Policy Framework and the Network Improvement Document.

POLICY FRAMEWORK

The Policy Framework provides an overview of the policies and components of a successful bicycle program including education, outreach, enforcement and bicycle parking. The goals and objectives (listed in the Executive Summary) for the Policy Framework are based on the goals and objectives in the 1997 San Francisco Bicycle Plan. These updated goals and objectives reflect the City's commitment to improving the quality of life of its residents and expanding the role and importance of bicycle transportation in the City of San Francisco. The goals and objectives were developed and refined based on comments from City staff from numerous departments, the OC, the SFBC, and the public.

This Plan presents a framework for the City to provide the safe and attractive environment needed to promote bicycling as a transportation mode. Since the adoption of the City's first Bicycle Plan in 1997, a tremendous amount has been accomplished: scores of facilities improvements were implemented; new bicycle programs continue to be developed; San Francisco ranked as one of the nation's best cycling cities by Bicycling Magazine in 2001; and according to the US Census, San Francisco's commute bicycle use doubled from 1990 to 2000, while collisions involving bicyclists decreased (More extensive information on collisions can be found in Chapter 6).

This Plan presents major enhancements to San Francisco's bicycle planning framework by:

- emphasizing an expansion and refinement of the existing Bicycle Network;
- incorporating new design guidelines for a wide range of bicycle facilities, inspired by recently developed standards from other jurisdictions across the nation and around the world; and
- updating many chapters and topics of the City's original 1997 Bicycle Plan.

NETWORK IMPROVEMENT

The second component of the overall Bicycle Plan Update is the Network Improvement Document. It identifies potential projects to improve bicycle transportation throughout San Francisco. The Network Improvement Document consists of detailed traffic engineering design concepts for each project. It also examines issues that need to be resolved prior to project funding, such as the need for demonstrated public support or mitigation of impacts as identified through the environmental review process. Another goal of this document is to provide enough of an assessment of the project so potential funding agencies can determine if the project is feasible.

Photo Credit: Michael Rauner (courtesy of SFBC)

A bicyclist travels the Valencia Street bike lanes on a local shopping trip.

Once the Network Improvement Document is complete, it will be presented to the Municipal Transportation Agency (MTA) Board for approval. The projects identified in the Network Improvement Document will still require environmental review and approval by the BOS prior to implementation. Chapter 2 of this Plan outlines the potential projects that will be further developed in the Network Improvement Document.

SAN FRANCISCO'S CHALLENGES TO BICYCLING

While bicycling in San Francisco is a transportation option for some, it still presents challenges. Among them are the City's topography, concentrated development, and high traffic volumes. The Bicycle Route Network directs bicyclists to the flattest streets with low traffic volumes or slow motor vehicle speeds, where possible, as well as connecting major attractors and neighborhoods.

However, physical and institutional limitations to the Bicycle Route Network and throughout the City still exist. The built urban environment constrains the ability to accommodate the many competing transportation modes. A finite space exists for pedestrians, motor vehicles, transit, and bicyclists. When bicycle facility improvements are made, the impacts to other modes must be taken into consideration and balanced with the overall vision of transportation in the City. The City's Transit First Policy provides principles to help guide this vision for bicyclists, transit and other modes.[2]

2 Section 16.102 of the San Francisco Charter-TRANSIT-FIRST POLICY.

The following principles shall constitute the City and County's transit-first policy and shall be incorporated into the General Plan of the City and County. All officers, boards, commissions, and departments shall implement these principles in conducting the City and County's affairs:

SAN FRANCISCO LAND USE

The City and County of San Francisco has approximately 780,000 residents within approximately 47 square miles: an average population density of 16,500 persons per square mile. San Francisco's neighborhood-based land use patterns contribute to the appeal of utilitarian and recreational bicycling. Unique recreational resources (such as Golden Gate Park, Crissy Field, the Presidio, the Ocean Beach and Lake Merced multi-use paths, and the Golden Gate Bridge) and neighborhood commercial areas scattered across the City provide "bikable" opportunities in most neighborhoods. Employment (including technology, financial, medical, commercial, and industrial job-centers), are located in many City districts. Although major public buildings are near the geographic center of the City (such as City Hall, other City offices, and the Main Library), other facilities, such as schools and some public services, are found citywide. While San Francisco's neighborhood structure lends itself to neighborhood bicycle trips, opportunities for recreational resources, employment, schools and public services throughout San Francisco also exist. It is important that the Bicycle Route Network serve the entire City, including links to all of the land uses described above. Figure 1-1 illustrates some San Francisco land uses, neighborhoods, and public buildings.

SAN FRANCISCO DEMOGRAPHICS

COMMUTE PATTERNS

A central focus of presenting commute information is to identify the current mode split of people that live and work in San Francisco. Mode split refers to the form of transportation a

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1. To ensure quality of life and economic health in San Francisco, the primary objective of the transportation system must be the safe and efficient movement of people and goods.

2. Public transit, including taxis and vanpools, is an economically and environmentally sound alternative to transportation by individual automobiles. Within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile.

3. Decisions regarding the use of limited public street and sidewalk space shall encourage the use of public rights of way by pedestrians, bicyclists, and public transit, and shall strive to reduce traffic and improve public health and safety.

4. Transit priority improvements, such as designated transit lanes and streets and improved signalization, shall be made to expedite the movement of public transit vehicles (including taxis and vanpools) and to improve pedestrian safety.

5. Pedestrian areas shall be enhanced wherever possible to improve the safety and comfort of pedestrians and to encourage travel by foot.

6. Bicycling shall be promoted by encouraging safe streets for riding, convenient access to transit, bicycle lanes, and secure bicycle parking.

7. Parking policies for areas well served by public transit shall be designed to encourage travel by public transit and alternative transportation.

8. New transportation investment should be allocated to meet the demand for public transit generated by new public and private commercial and residential developments.

9. The ability of the City and County to reduce traffic congestion depends on the adequacy of regional public transportation. The City and County shall promote the use of regional mass transit and the continued development of an integrated, reliable, regional public transportation system.

10. The City and County shall encourage innovative solutions to meet public transportation needs wherever possible and where the provision of such service will not adversely affect the service provided by the Municipal Railway. (Added November 1999)

person chooses: walking, bicycling, taking a bus or train, driving, etc. One major objective of any bicycle facility improvement is to increase the percentage of people who choose to bicycle rather than drive a car or be driven. Every eliminated motor vehicle trip or vehicle mile represents a quantifiable reduction in air pollution and other problems associated with traffic congestion.

SAN FRANCISCO RESIDENTS BICYCLING TO WORK[3]

Journey to work data from the 2000 U.S. Census for San Francisco, California, and the United States is shown in Table 1-1.

Table 1-1
Journey to Work Data

Mode	United States	California	San Francisco
Bicycle	0.4%	0.8%	1.9 %
Drove Alone	75.7%	71.8%	41.0%
Carpool	12.2%	14.6%	9.3%
Public Transit	4.7%	5.1%	32.2%
Walked	2.9%	2.9%	8.8%
Other	4.1%	4.8%	1.1%

Source: U.S. Census 2000

San Francisco has the highest bicycle to work mode share of major U.S. cities having more than 500,000 inhabitants. According to Rides for Bay Area Commuters 2003 Commute Profile, about two percent (2%) of all San Francisco residents cycle to work giving the City a relatively high commute bicycling mode split. This represents five times the national average of four tenths of one percent (0.4%) and about two and one half times the state average of eight tenths of one percent (0.8%).

Bicycle commuters using the Market Street bicycle lanes.

According to a 2003 Rides Commuter Profile, 59% of potential Bay Area bicyclists are male; 63% have an income more than $65,000, and 40% are under the age of 40. Twenty-two percent of all Bay Area residents surveyed consider bicycling a viable option for their commute choice, while 32% of those surveyed cited that travel distance was the greatest obstacle for them to bicycle to work. The average San Francisco resident travels 10 miles to work in 29

3 It should be noted that if the U.S. Census respondents who work at home are subtracted from the commute population, the mode share for trips to work by bicycle would increase to 2.1% Additionally, it should be noted that the U.S. Census data although statistically valid, does not account for children bicyclist and non-work bicycle trips. It has been suggested that San Francisco's bicycle share is actually higher than 2.1%.

minutes, with three out of four residents living and working in the City and County of San Francisco. [4]

This information can be utilized in targeted marketing campaigns to encourage more bicycle ridership in San Francisco, and also begins to highlight the latent demand for bicycling with the Bay Area and San Francisco.

TRAVEL TIME TO WORK

Travel time to work for the United States, California, and San Francisco is shown in Table 1-2. This is important because it can give an indication of the number of potential new bicycle commuters. The average commute time in the U.S., regardless of mode, is about 30 minutes[5], while in Europe, travel times tend to be somewhat longer[6]

Table 1-2
Travel Time to Work Data

Travel time	United States	California	San Francisco
Less than 15 minutes	29.4 %	25.3 %	14.7 %
15 to 29 minutes	36.1 %	35.4 %	35.8 %
30 to 44 minutes	19.1 %	20.9 %	26.3 %
45 to 59 minutes	7.4 %	8.2 %	11.9 %
60 minutes or more	8.0 %	10.1 %	10.6 %

Source: U.S. Census 2000

Approximately fifteen percent of San Francisco residents have a commute time of 15 minutes or less. Assuming that travel occurs primarily on local roads during peak commute periods, a motor vehicle commute time of 15 minutes or less would be equivalent to about a 30 minute bicycle commute on flat terrain. Given this data, there is a substantial opportunity to convert some of the short distance (less than 15 minute) motor vehicle commute trips to bicycle trips.

Figure 1-2 shows mode-share by census tract, illustrating the current distribution of bicycle commuters in San Francisco, and highlighting geographic areas for potential improvement of bicycle facilities.

THE PLANNING PROCESS

In 1999, San Francisco adopted a "Transit First" policy including a series of principles to be implemented by all officers, boards, commissions and departments. This policy identifies transit, bicyclists and pedestrians as San Francisco's top transportation priorities. The policy states that "Bicycling shall be promoted by encouraging safe streets for riding, convenient access to transit, bicycle lanes, and secure bicycle parking." A wide variety of neighborhood plans, area plans,

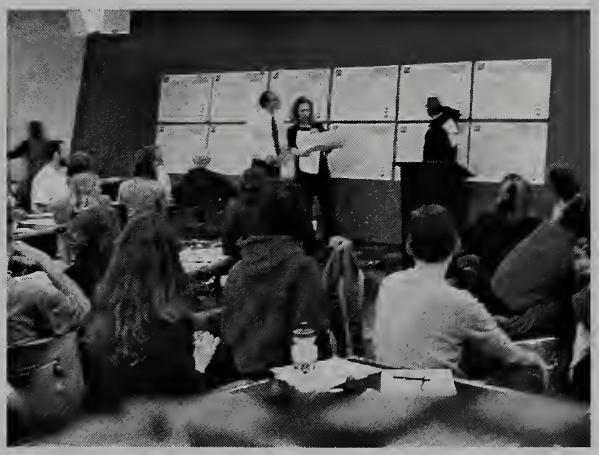
4 Rides Commuter Profile 2003 http://rideshare.511.org/research/commuterprofile2003.asp

5 U.S. Census http://www.census.gov/acs/www/Products/Ranking/2002/R04T040.htm

6 RAC Foundation for Motoring http://www.racfoundation.org/our_research/Commutepaper.htm

policy, and development plans also address transportation and multi-modal use of San Francisco's streets, sidewalks and pathways. Of these, San Francisco's General Plan Transportation Element is the most important. It contains official City policy on transportation. Other citywide plans need to conform to the General Plan, including this Bicycle Plan.

Work began on the Bicycle Plan Update in July 2002. The consultants' first tasks were to develop the Supplemental Design Guidelines and the Shared Use Pavement Arrow components of the Bicycle Plan Update. The first public meeting on the overall Bicycle Plan Update was held in February 2003. It kicked off a series of public meetings that spring that discussed the overall Plan, but focused on potential network improvements and the Supplemental Design Guidelines. These meeting were cosponsored by the SFBC. This participation was funded by a Caltrans community planning grant focused on public outreach for potential network improvements.



SF Bicycle Plan kick-off meeting at the LGTB Community Center in 2002.

Public input from this first series of meetings was utilized to generate a list of potential Bicycle Route Network improvements. This list was combined with other existing project lists (remaining recommendations from the 1997 Plan, projects previously recommended by bicycle advocates or members of the public, and improvements recommended through DPT staff analysis). By mid-summer 2003, a prioritization matrix was created and applied to rank this combined recommended project list, yielding a list of approximately 20 potential projects that the consultant would further develop. (*These projects are included in the Network Improvement Document and are noted within Chapter 2 of the Policy Framework.*)

By mid-summer 2003, initial data for the Shared Use Pavement Arrow had been collected and compiled; a draft of the Goals and Objectives for the overall bicycle planning document had been developed, and a draft of the Supplemental Design Guidelines were ready for Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT) review. ISCOTT approved the Supplemental Design Guidelines in September 2003. The Goals and Objectives of the overall Plan were finalized in November 2003 by the Bicycle Plan Update's Technical Advisory Committee and the OC. Throughout all of these processes, an active Technical Advisory Committee and OC helped guide and shape the Bicycle Plan Update documents.

By early 2004, the SFBC began outreach to hundreds of individual community groups, seeking input and comments on the potential project concepts that were developed by the consultants. The SFBC then held five highly advertised citywide meetings through the spring of 2004, again focusing on network improvements that were developed by the consultants. In February 2004 the Shared Use Pavement Arrow Report was completed and DPT staff finished compiling the administrative draft of the Bicycle Plan Policy Framework. By spring 2004, the TAC and OC had completed review of the administrative draft Bicycle Plan Policy Framework, and released it for public review at the end of May. Throughout the month of June, the BAC solicited public

comment on this draft, and in July they approved the draft Policy Framework. The MTA Citizen's Advisory Council (MTA CAC) made their recommendations on the Bicycle Plan Policy Framework in July. The Supplemental Design Guidelines and Shared Lane Pavement Marking Study are both appendices to the Bicycle Plan Policy Framework.

In September 2004, a final citywide meeting is planned to present the final Bicycle Plan Policy Framework to the public, while calendaring this portion of the Bicycle Plan Update for MTA Board approval in late September. Then it will undergo environmental review and General Plan Referral by the Planning Department. This will be followed by Planning Commission, appropriate BOS' Committee (currently the Land Use Committee), full BOS, and the Mayor's approvals.

The Bicycle Plan Update Network Improvement Document will be a culmination of the consultant's work on network improvement concepts and the public input generated by the SFBC's outreach. This portion of the overall planning process will help lay out design concepts that will be used to apply for project funding. It will also provide demonstrated public support and mitigated impacts to other transportation modes. Each project will still need to secure funding and necessary department approvals, environmental clearance, and have detailed engineering plans in place prior to construction.

This process involved a high level of public participation. The SFBC's extensive public outreach resulted in:

- A series of citywide and neighborhood-specific workshops to solicit suggestions for improving the Bicycle Route Network;
- Surveys designed to solicit City residents' input on potential Bicycle Route Network improvements, network maintenance needs, bicycle parking needs, and policy and program needs;
- Follow up workshops to present proposed network improvements to the neighborhoods; and
- Extensive citywide outreach on specific project proposals to solicit input from merchants, neighborhood groups, and generally interested citizens.

This process involved about 5,000 comments resulting in over 2,800 specific street improvement suggestions, and nearly 2,000 comments related to bicycle policy improvements in San Francisco.

AGENCY RESPONSIBILITY FOR PLAN IMPLEMENTATION

Several key agencies are identified in the recommended action items. The responsibility of each identified agency in implementing the Bicycle Route Network and administering important support functions for bicyclists is summarized below.

Table 1-3
Agency Responsibility

Area of Responsibility	Relevant Agency	Role
Funding	DPT Bicycle Program	Pursues bicycle project and program grant funding from federal, state, regional, and city/county agencies. Works with other departments/agencies to include bicycle components in grants for non-bicycle specific projects.
	SFCTA	Administers and oversees delivery of Proposition K half-cent local transportation sales tax program. Serves as San Francisco Program Manager for Transportation Fund for Clean Air (TFCA) grants, approving funding and selecting projects. Approves funding and Selects projects for other state and federal funding through the Metropolitan Transportation Commission (MTC). Can act as partner applicant/grant seeking agency for funding from other agencies.
Facility Improvements	DPT Bicycle Program	Is lead planning and engineering agency (Bicycle Program staff and other Traffic Engineering staff) for roadway and bicycle facility improvements.
	DPW	Provides engineering and contract management services for bicycle projects involving major construction.
Policy Change	DPT Bicycle Program	Initiates dialog with appropriate departments and agencies including the Planning Department, BOS, etc. to pursue policy change to improve bicycle facilities and programs
Program Development	DPT Bicycle Program	Initiates and administers programs related to bicycle education, promotion, and support facilities such as bicycle parking
	Department of the Environment (SF Environment)	Initiates, implements, and promotes energy saving and resource protection programs for City staff and residents, including air quality, transportation options, etc.
Traffic Enforcement	San Francisco Police	Responsible for traffic safety of

Table 1-3
Agency Responsibility

Area of Responsibility	Relevant Agency	Role
	Department (SFPD)	motorists, bicyclists, and pedestrians through law enforcement
Parking Enforcement	DPT Enforcement Division	Responsible for enforcement of parking regulations, including double parking
Code Enforcement	Planning Department	Responsible for enforcing the Planning Code provisions related to bicycle facilities, including bicycle parking and access to buildings and structures.
Environmental Review	Planning Department	Responsible for review of proposed bicycle projects under the California Environmental Quality Act (CEQA)
General Plan Conformity	Planning Department	Ensures that this Plan and certain bicycle projects are consistent with the General Plan. Updates the General Plan-Transportation Element (see Bicycle Plan Update Chapter 8). Ensures that all other plans are consistent with the General Plan.
Transit Access	San Francisco Municipal Railway (Muni), BART, Caltrain (PJPB), Samtrans, AC Transit, Golden Gate Transit (GGT)	Responsible for management of transit infrastructure and services including provisions for bicycle access to transit vehicles and stations

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Figure 1-1:
San Francisco Overview

Data Source: San Francisco DPW, Planning Department

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Figure 1-2:
Bicycle Mode Split by Census Tract

Data Source: San Francisco DPW, DPT, U.S. Census 2000, Rides for Bay Area Commuters 2003 Commute Profile

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RECOMMENDED ACTION ITEMS

Implementation of this Plan involves participation and the cooperation of many different City departments. In addition to the DPT, recommendations are made that require direct coordination, partnership, analysis, design development and implementation in association with the following departments and other agencies: the Planning Department, the Port of San Francisco, the Recreation and Park Department, the DPW, Muni, The Redevelopment Agency, the Department of Environment (SF Environment), BART, Caltrain, Caltrans, and other transit providers that operate in San Francisco. Implementation actions are identified at the beginning of each chapter and responsible agencies are identified where applicable.

FUNDING

This section describes existing and potential funding sources to implement the various recommendations of this Plan.

GENERAL

Outside funding plays a crucial role in implementing bicycle projects and programs. This is especially true in San Francisco, which unlike other major U.S. cities, does not currently budget any funds from the general fund for the Bicycle Program.

In addition to bicycle-specific funding sources, there are other more flexible funding sources than can be used to fund some bicycle projects and programs. Many of these funding sources can only be used for bicycle projects under very specific conditions and/or in conjunction with other projects.

An excellent and exhaustive list of both bicycle-specific and general funding sources that may be able to be used to fund bicycle projects and programs is the "Guide to Bicycle Project and Program Funding in California,"[8] Second Edition, by Gail Payne, February 2002 (a combined effort of the California Bicycle Coalition, Caltrans Bicycle Facilities Unit and the Planning and Conservation League Foundation). It provides an update of available bicycle project and program funding sources in California, and identifies key bicycle-related contacts to help obtain federal, state, local and private monies. Several excerpts from that Guide are included throughout the remainder of this section.

The above mentioned funding guide consists of two sections: primary and secondary funding sources. A funding source is designated "secondary" when it only is indirectly related to bicycling, when it may be in jeopardy or when a minimal amount of funding is available from the source.

8 The "Guide to Bicycle Project and Program Funding in California" can be viewed online at http://www.calbike.org/pdfs/guide2.pdf or by visiting the California Bicycle Coalition's website at http://www.calbike.org. Bound hard copies are available from the California Bicycle Coalition ((916) 446-7558) for $5 each, plus $10 shipping and handling per order.

A guide to general transportation funding in the San Francisco Bay Area is "Moving Costs: A Transportation Funding Guide for the San Francisco Bay Area,"[9] published by MTC in January 1999, and revised in Spring 2000. This guide consists of detailed tables summarizing federal, state and local sources of money, indicating the amount available, eligible uses, and potential Bay Area candidates.

Funding sources that have been utilized in the past by the Bicycle Program include:

- BAAQMD Transportation Fund for Clean Air (TFCA)
- Bicycle Transportation Account (BTA)
- Golden Gate Park Concourse Authority
- Transportation Equity Act for the 21st Century (TEA21, ISTEA's successor)
- Office of Traffic Safety (OTS)
- Safe Routes to School (SR2S)
- SFCTA Proposition B (now Proposition K) One-Half Cent Sales Tax
- State Transportation Improvement Program (STIP)
- TDA Article 3 - Various projects

FEDERAL

The most recent federal surface transportation act, the Transportation Equity Act of the 21st Century (TEA-21), was authorized in 1997. TEA-21 retained many of the features of its innovative predecessor called the Intermodal Surface Transportation Efficiency Act (ISTEA), such as providing flexible funding sources that could be used more readily for bicycle, pedestrian and transit projects rather than the traditional emphasis on highway, streets, and roads projects. In 2003, a successor to the TEA-21 federal transportation act was expected to be authorized. However, as of September 2004, this successor act is still pending before Congress. It is expected to retain the basic structure of TEA-21.

The Funding Guide includes a table (Table 1: Primary Federal Bicycle Program and Project Funding Sources) that summarizes the primary federal funding sources for bicycle programs and projects. The Guide's Figure 1: Federal Transportation Funding) summarizes the various TEA-21 programs.

In the Bay Area, much of the federal funding relevant to bicycle projects is funneled through the MTC. On December 17, 2003, MTC approved $200 million for a new Regional Bicycle and Pedestrian Program for the nine San Francisco Bay Area counties. This program will provide new funding to build bicycle and pedestrian projects of regional significance. Seventy-five percent of the program funds will be given to the county congestion management agencies (e.g. SFCTA for San Francisco) to program to bicycle and pedestrian projects in their jurisdictions while the remaining 25% of the funds will be programmed by MTC through a regional competitive process. The funds were dedicated as part of the Transportation 2030 process (the 2005 RTP), which provides a vision for how all transportation funds will be spent in the San Francisco Bay Area from the years 2005 through 2030.

9 This Guide can be viewed at http://www.mtc.ca.gov/publications/funding_guide/fund_guide-htm/funding_guide01.htm A printed copy can be ordered by contacting the MTC-ABAG Library (510) 464-7836 or library@mtc.ca.gov

STATE

The Guide's Table 2 (Primary State Bicycle Program and Project Funding Sources) summarizes the different types of state funding sources available to bicycle projects and programs. The primary state bicycle-related funding sources include the BTA, the SR2S Program and the STIP.

A resource that is not shown in the Funding Guide is the San Francisco Bay Area's Regional Transportation Improvement Program (RTIP)[10]. It is the Bay Area's proposal to the State of California for how the region's STIP funds should be spent in the current STIP for transit, state highway, local road, bicycle, and pedestrian projects that the region proposes for funding through the STIP within the next 20 years. As Congestion Management Agency (CMA) for San Francisco, SFCTA develops the San Francisco list of projects to be funded in the STIP, following MTC's guidelines. As the Regional Transportation Planning Agency (RTPA) for the Bay Area, The MTC is responsible for approval of the region's funding priorities for the STIP, and for submitting the projects to the California Transportation Commission (CTC) by way of the RTIP. Note that due to the State's current budget situation and its effect on the State Highway Account, there is limited funding available for new projects in the short-term. The development of the 2004 STIP consisted primarily of re-spreading (i.e., delaying) existing projects in the 2002 STIP to the later years of the 2004 STIP, with no new projects being added for San Francisco

LOCAL/REGIONAL

The Guide's Table 3 (Primary Local/Regional Bicycle Program and Project Funding Sources) summarizes the primary local/regional funding sources, including TDA Article 3, local air district funds, and county transportation sales taxes.

In San Francisco, the SFCTA was created in 1989 to administer Prop K's predecessor, the Proposition B half-cent transportation sales tax program, which began in 1990 and continued until it was superseded by Proposition K, which was approved by 75% of San Francisco voters in November 2003. Prop K contains a new Expenditure Plan and extended the existing half-cent transportation sales tax for 30-years. The SFCTA administers and oversees the delivery of the Expenditure Plan which identifies transportation improvements to be funded from half-cent transportation sales tax. Over the 30-year life of Prop K, the New Expenditure Plan includes $19.1 million for Pedestrian and Bicycle Facility Maintenance and $56.0 million for Bicycle Circulation/Safety. Bicycle projects are also eligible for funding when included as part of projects eligible under other Expenditure Plan categories such as traffic calming.

Proposition K calls for the development of 5-year prioritization plans for its programmatic categories (e.g. traffic calming, transit enhancements, bicycle circulation/safety), development of the Strategic Plan (a 10+ year look ahead at Proposition K programming), and allocation of funds to specific projects and programs.

Implementation of the Expenditure Plan relies heavily on leveraging of Prop K funds with other federal, state, and local funds – some of which the SFCTA programs as CMA for San Francisco. SFCTA also selects San Francisco projects for funding with San Francisco's Local Program

10 http://www.mtc.ca.gov/funding/rtip-04.htm

Manager Funds from the BAAQMD TFCA program. The BAAQMD selects projects through a competitive process for the Regional TFCA funds.

The SFCTA also tracks transportation system performance to ensure that San Francisco gets good value for its transportation investments and prepares a long-range Countywide Transportation Plan to guide future investment decisions.

Another San Francisco-specific funding source is the Golden Gate Park Concourse Authority. This body was created in May 1999 as a result of the passage of the Golden Gate Park Revitalization Act of 1998 or Proposition J on the San Francisco ballot. They oversee coordination of construction and improvement projects in the Music Concourse area of Golden Gate Park, including the construction of an underground parking facility. The Concourse Authority has provided funds to the SFBC and the DPT for study of bicycle facility improvements.

NON-TRADITIONAL FUNDING SOURCES

In addition to the traditional funding sources described above, there are also a variety of non-traditional funding sources that might be available for the long term implementation of project and program recommendations contained in this Plan. These include potential grant and foundation opportunities, funding approaches used by several large employers, potential development/redevelopment recommendations, the development of alliances with other organizations and agencies with related bicycle promotion interests, and recommended approaches to more effectively using existing public and private funding available for bicycle related enhancement and maintenance efforts.

Since the Bicycle Program has a very good track record of obtaining traditional types of grants, and since the Proposition K half-cent transportation sales tax program includes more than $75 million over 30 years for Pedestrian and Bicycle Facility Maintenance and Bicycle Circulation/Safety, it is recommended that the Program continue to optimize the use of existing grant sources and also seek non-traditional funding sources where appropriate. For more information on non-traditional funding sources, please refer to Chapter 4 of the 1997 Bicycle Plan.

Included below are some suggestions for additional sources of bicycle funding that were made in this Plan's public outreach process. They involve political City policy decisions that must be made by the BOS or the voters. The most appropriate body to advocate for these changes is the SFBC.

- The City should dedicate funding for multi-modal transportation and not reduce funding for transportation when there is a City budget crisis; and

- Secure dedicated funding from City's transportation budget for specific bicycle facilities and enhancements.

In addition, the SFCTA can be a resource in helping to identify and advocate for new funding sources. If MTC moves forward with a regional gas tax, the DPT should advocate for an equitable share of the revenues for bicycle projects.

CONSISTENCY WITH STATE REQUIREMENTS FOR BICYCLE PLANS

It is important that this Plan is consistent with California's requirements for bicycle plans. One of the funding sources cited in the Funding Section is the state BTA, which funds city and county projects that improve safety and convenience for bicycle commuters. To be eligible for BTA funds, cities and counties must have a Bicycle Transportation Plan (BTP) that discusses items (a) through (k) in Section 891.2 of the Streets and Highways Code. The city or county local agency governing board must adopt the BTP or certify that it has been updated and complies with Section 891.2 and the Regional Transportation Plan (RTP). The BTP must have been adopted no earlier than four years prior to July 1 of the fiscal year in which BTA funds are granted. The local agency must submit the BTP to the appropriate Metropolitan Planning Organization (MPO) or RTPA for review and certification that it complies with Section 891.2 of the Streets and Highways Code and the RTP. Following regional approval, the local agency must submit the BTP to Caltrans Bicycle Facilities Unit (BFU) for review and approval.

Table 1-4
Bicycle Transportation Account (BTA) Requirements Checklist

BTA Requirement	Page(s)
1. Existing and Future Bicycle Commuters	1-6 through 1-15
2. Land Use Map/Population Density	1-13
3. Existing and Proposed Bikeways	2-4 through 2-46
4. Existing and Proposed Bicycle Parking Facilities	3-1
5. Existing and Proposed Multi-Modal Connections	4-1 though 4-6
6. Existing and Proposed Changing and Storage Facilities	7-4, 7-5
7. Bicycle Safety and Education Programs	5-1 through 5-10
8. Citizen Participation	1-2, 1-3
9. Consistency with Transportation, Air Quality, and Energy Plans	1-1, 1-3
10.Project Descriptions/Priority Listings	2-10 through 2-18
11.Past Expenditures and Future Financial Needs	1-17

CONTENTS OF THIS POLICY PLAN

SUMMARY OF CHAPTERS

This Plan contains the following chapters:

CHAPTER 1: INTRODUCTION

The Introduction describes the two major parts of the 2004 Bicycle Plan Update: the Policy Framework and the Network Improvement Document. The chapter continues with an introduction to San Francisco land use, demographics: the overall planning process for this Plan; agency responsibility for plan implementation; and finally funding.

CHAPTER 2: BICYCLE ROUTE NETWORK

The Bicycle Route Network Chapter provides an overview of recommended improvements to the citywide Bicycle Route Network, a discussion of facility types, and a summary of the ISCOTT-adopted Supplemental Design Guidelines to the Plan (that provide new design standards for bicycle facilities). Chapter 2 sets the stage for implementation of specific project improvements and outlines potential projects to be further defined in the Network Improvement Document.

CHAPTER 3: BICYCLE PARKING

The Bicycle Parking Chapter provides an overview of the existing Planning Code governing provision of bicycle parking for public and private buildings and garages and recommends improvements for administration and enforcement, as well as providing new guidelines for implementation of bicycle parking throughout the City.

CHAPTER 4: TRANSIT AND BRIDGE ACCESS

The Transit and Bridge Access Chapter addresses the linkages between bicycle trips and transit service, as well as bicycle access to local and regional bridges. By improving bicycle access to transit vehicles and stations, many opportunities are created for increased bicycle trips. This chapter contains recommendations for creating greater bicycle access to Muni and other transit agencies' vehicles and to existing and future transit stops and stations.

CHAPTER 5: EDUCATION

The Education Chapter provides an overview of the City's bicycle educational outreach efforts. It recommends creating a comprehensive set of general and targeted DPT cycling safety classes and workshops. The Education Chapter addresses several aspects of bicycle safety for bicyclists, motorists, and City staff to ensure that all parties are aware of cyclists' rights and responsibilities.

CHAPTER 6: ENFORCEMENT AND SAFETY

The Enforcement Chapter summarizes existing traffic violations and collisions involving bicyclists and makes recommendations for improved enforcement. To improve safety for bicyclists throughout the City, the recommendations focus actions related to both motor vehicle and bicycle traffic violations.

CHAPTER 7: PROMOTION

The Promotion Chapter focuses on attracting new bicyclists to the streets of San Francisco, keeping existing bicyclists on the road, and generally promoting awareness of the benefits that increased bicycle usage holds for the City.

CHAPTER 8: GENERAL PLAN AMENDMENTS, ENVIRONMENTAL REVIEW, AND CITYWIDE COORDINATION GOALS, OBJECTIVES, AND ACTION ITEMS

The General Plan Amendments, Environmental Review, and citywide Coordination Chapter addresses many elements that are relevant to bicycle policy consistency. This chapter focuses on recommended modifications to the General Plan's Transportation Element, Downtown Area Plan, and to the city's environmental review guidelines.

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2. BICYCLE NETWORK

BICYCLE NETWORK GOALS AND OBJECTIVES

Goal:

Refine and Expand the Existing Bicycle Network.

Objectives:

- Provide safe space for bicyclists through a comprehensive network of bikeways that are appropriately signed, marked, and/or traffic-calmed. Ideally, the facilities would include on-street routes, marked bicycle lanes, and off-street bicycle paths;
- Utilize innovative designs, where appropriate, to improve bicycle usage and safety; and
- Ensure the Bicycle Network:
    - allows bicycle access within a quarter mile of major commercial and residential areas;
    - provides access to all San Francisco Municipal Railway (Muni) metros, Bay Area Rapid Transit (BART), and Caltrain stations; and ferry terminals and other major transit hubs; and
    - is well signed.

RECOMMENDED BICYCLE ROUTE NETWORK ACTIONS

City staff should prioritize the following actions to implement the recommended additions to the Bicycle Network:

Action 2.1
Complete the Bicycle Plan: Network Improvement Document.

Action 2.2
Update the Official Bicycle Route Network Map to reflect route relocations, and periodically update the Bicycle Route Network identified within the San Francisco General Plan.

Action 2.3
Complete the required design and engineering for improvements to Recommended Study Streets and implement in conjunction with the Department of Public Works' (DPW's) Five Year Proposed Utility Excavation and Paving Plan, if feasible.

Action 2.4
Implement the Transit First Policy's bicycle and transit elements.

Action 2.5
Select a new or a modified exclusive bus lane to conduct a before and after study, in conjunction with Muni, to allow bicycles.

Action 2.6
Amend San Francisco Traffic Code (TC) Section 31 to allow bicyclists in exclusive bus lanes, when they are right curb lanes; except on one-way streets.

Action 2.7
Review multi-lane streets that currently have excess capacity (i.e. less than 600 vehicles per lane per hour during the peak-hour). The removal of a travel lane due to excess capacity could assist in accommodating bicycle lanes or other bicycle-friendly treatments.

Action 2.8
The San Francisco County Transportation Authority (SFCTA) and the Planning Commission should adopt the SFCTA LOS Technical Working Group (TWG)'s recommend revisions to San Francisco's level of service (LOS) standards and methodologies such that they better respond to the multimodal nature of San Francisco's transportation system, specifically addressing bicycles.

Action 2.9
Define and identify "bicycle arterial streets," conduct public outreach, and seek a Municipal Transportation Agency (MTA) policy decision to modify the Traffic Calming Guidelines.

Action 2.10
Implement Supplemental Design Guidelines on specific Recommended Network Improvement projects with the appropriate level of analysis and study.

Action 2.11
Prioritize phased application of the Shared-Use Pavement Arrow on appropriate existing signed bicycle routes, wide curb lanes, and newly designated routes where bicycle lane implementation is demonstrated to be infeasible.

Action 2.12
Develop and enforce a set of standards that must be strictly adhered to by contractors for street excavation restoration, including a guarantee of one year for replacement of any defective work.

Action 2.13
Amend DPW's guidelines to allow acceptance of a City street due to its inclusion on the Bicycle Route Network, subject to Board of Supervisor approval.

Action 2.14
Create a prioritized bicycle pathway inventory that would include: surface condition of every path within the City; signing and lighting inventory and needs of paths; and respective agency responsible for the maintenance of a path.

Action 2.15
Maintain a minimum of a weekly sweeping schedule (DPW and the Recreation and Park Department) - especially for off-street paths that are not currently cleaned on a regular schedule - in addition to sweeping bikeways whenever there is an accumulation of gravel, glass, sand, etc.

Action 2.16
Increase the profile of the Bicycle Route Network within DPW's street resurfacing and paving prioritization process.

Action 2.17
Create an inventory of locations along the Bicycle Route Network that intersect or run parallel to railroad tracks. Appropriate measures should be undertaken to mitigate the impacts of the track crossings to bicyclists. Removal of unused tracks along the Bicycle Route Network should also be undertaken.

INTRODUCTION

Action 2.1 Complete the Bicycle Plan: Network Improvement Document.

The existing Bicycle Route Network is the result of many years of work by the Department of Parking and Traffic (DPT) Bicycle Program, San Francisco Bicycle Coalition (SFBC), the Bicycle Advisory Committee (BAC), and many other agencies and organizations. The Bicycle Route Network, included as part of the San Francisco General Plan's Transportation Element, is therefore a component of the City's official transportation policy. A goal of this Plan is to improve and expand the existing Bicycle Route Network in a meaningful way to increase safe space for bicyclists Citywide and to improve the visibility of the Network on San Francisco's primary collector and arterial streets. As changes to the network occur, periodic updates of the Bicycle Route Network within the San Francisco General Plan should occur.[1]

The first chapter of this Plan outlines the two components of the overall Bicycle Plan (Policy Framework and Network Improvement). This chapter outlines a "blueprint" of potential projects that will be included within the Network Improvement Document.

The potential projects listed within this chapter fall into two general categories: those that are part of the existing Bicycle Network, and those that are not. Additionally, where extensive multi-jurisdictional participation will be required, or where broader issues (extensive parking loss,

1 Recommended amendments to the San Francisco General Plan can be found in Chapter 8 of this document.

changes in land use, immitigable impacts to transit operations, streetscape reconfiguration, etc.) exist, Study Areas are recommended.

This chapter does not attempt to identify specific facility types for improvements or additions to the Bicycle Route Network. As part of the more extensive Network Improvement Document, potential projects will be brought to the Municipal Transportation Agency (MTA) Board and the Board of Supervisors (BOS) after the required environmental clearance is obtained. This chapter provides a framework for the overall existing Bicycle Route Network and a general list of potential projects and areas to be studied. This chapter does not recommend specific facilities (wide outside lanes, bike lanes, or bike paths); rather, the appropriate facility types will be determined when a particular project is studied.

EXISTING BICYCLE ROUTE NETWORK

Historically, San Francisco bicycle facilities were placed only on streets where potential conflicts with other competing demands were minimal. As the 1997 Bicycle Plan was implemented, bicycle facilities were increasingly located on high-volume, complex streets that provide greater access to the places cyclists want to go. Recent San Francisco bicycle projects, such as the bicycle lanes on Fell, Valencia and Polk Streets[2], exemplify the planning and design challenges, as well as the benefits for bicyclists, when major transportation corridors are retrofitted.

The existing Bicycle Route Network, established by the 1997 San Francisco Bicycle Plan and subsequent implementation projects completed since adoption of that Plan, is shown in Figure 2-1. A summary of the total miles of each bicycle facility type as of 2002 is shown in Table 2-1.

Table 2-1
San Francisco Bicycle Network

Facility Type	Mileage Total *
Bicycle Lane (Class II)	34 miles
Bicycle Path (Class I)	29 miles
Bicycle Route+ (Class III)	88 miles
Wide Curb Lane+ (Class III)	54 miles
TOTAL	205 miles

* This is the approximate number of miles of City streets with bicycle facilities and not the actual number of miles of bicycle facilities i.e.: It is not 34 miles of bicycle lanes, but 34 miles of City streets with bicycle lanes (whether a two-way street with bicycle lanes in each direction or a one-way street with a bicycle lane in only one direction). For reference, San Francisco has a total of 1,088 miles of streets.

+ Bicycle routes and streets with wide curb lanes are signed as bicycle routes, but do not have bicycle-specific pavement striping.

2 The Fell, Valencia and Polk Street Reports can be found on the Bicycle Program's website under "Reports and Studies" http://www.bicycle.sfgov.org/site/dptbike_index.asp?id=18784

Figure 2-1:
Existing Bicycle Route Network

Data Source: San Francisco DPW, DPT

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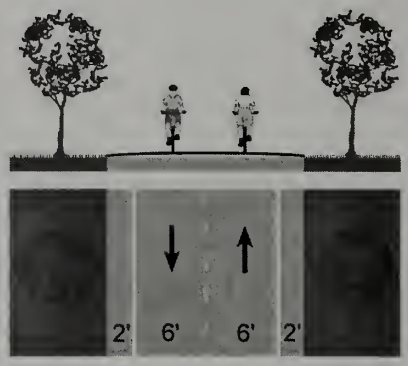


Figure 2-2: Class I - Bicycle Path or Multi-Use Trail

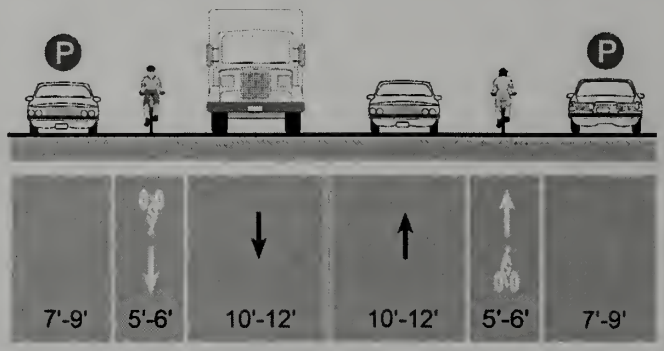


Figure 2-3: Class II - Bicycle Lane Adjacent to Parking

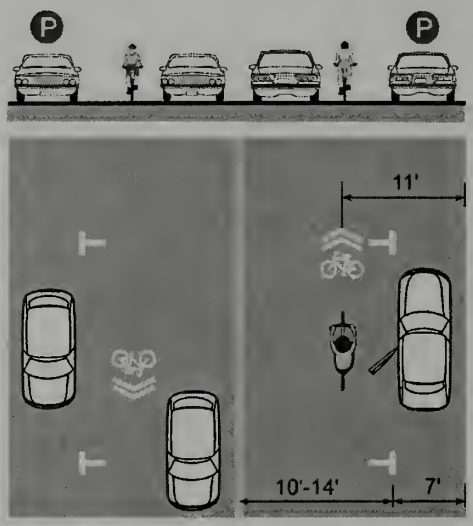


Figure 2-4: Class III - Signed Bicycle Route

BICYCLE NETWORK FACILITY TYPES

The existing Bicycle Route Network is composed of Class I[3], II, and III facilities. Typical cross sections of these facility types are shown in Figures 2-2 through 2-4 above. Class III bicycle facilities may consist of a variety of treatments, including streets with: wide curb lanes, shared-use pavement arrow markings, traffic calming measures, or simply signed streets. Additional details on these and proposed new facility types can be found in Appendix A: Supplemental Design Guidelines.

A facility enhancement that could improve the Bicycle Route Network is the shared-use pavement arrow marking. While this chapter does not make recommendations as to facility type, it should be noted that shared roadways on the Bicycle Route Network could be significantly improved now that the shared-use pavement arrow marking has been approved by the California Traffic Control Device Committee (CTCDC). However, it must now be approved by the California Department of Transportation (Caltrans) for implementation.

CHANGES TO THE EXISTING BICYCLE ROUTE NETWORK

Action 2.2 Update the Official Bicycle Route Network Map to reflect route relocations, and periodically update the Bicycle Route Network identified within the San Francisco General Plan.

The existing Bicycle Route Network Map is managed and identified in within the City of San Francisco Geographic Information System (GIS), and is shown on the existing official published Citywide bicycle user map. Most importantly, the Bicycle Route Network is designated within the San Francisco General Plan's Transportation Element. Modifications have occurred to the Bicycle Route Network since the 1997 Plan. Major modifications to the Bicycle Route Network need to be reflected within the General Plan. Modifications have occurred for the following primary reasons:

- relocations of the official numbered Bicycle Route Network from an existing street location or segment to a new location;
- the addition of the official Bicycle Route Network designation to existing bicycle facilities; and
- removal of the official Bicycle Route Network designation from temporary or outdated facilities recommended in the 1997 Bicycle Plan, that have since been made obsolete by new or improved facilities elsewhere.

3 Multi Use Trails can also accommodate pedestrians. However, the California Highway Design Manual recommends that if large pedestrian volumes are expected, then separate facilities for pedestrians be developed.

The above modifications to the existing Bicycle Route Network are presented in Table 2-2, and are also depicted in Figure 2-5. As changes to the network occur, periodic updates of the Bicycle Route Network within the San Francisco General Plan should occur.

Table 2-2
Changes to the Existing Bicycle Route Network

Street or Path	From	To	Rationale for Network Change
Network Relocations			
Alemany Boulevard[5]	San Jose Avenue	Bayshore Bouevard	Addition as part of this planning effort
Fell Street	Scott Street	Baker Street	Addition of striped bicycle lane creates an extension of the "Wiggle"[4]; Route 30 will be shifted from Hayes Street to Fell Street
Hayes Street	Scott Street	Baker Street	Relocation to Fell Street
Palou Avenue	Newhall Street	Phelps Street	Relocate Route 170 from Palou Avenue and Phelps Street to Oakdale Avenue in conjunction with new bike lanes and a pedestrian plaza on Oakdale Avenue.
Palou Avenue	Third Street	Newhall Street	
Phelps Street	Oakdale Avenue	Palou Avenue	
Third Street	Terry Francois Boulevard	Cargo Way	Removed from 3rd Street due to Light Rail construction. Also see Illinois Street.
Removal of Interim 1997 Network Designations			
Alemany Boulevard	Arch Street	Saint Charles Avenue	1997 Plan, p. 3-36 discusses Route 75 interim measure that is no longer necessary. It is being eliminated because the St. Charles Path was reconstructed and a traffic signal installed to improve bicycle circulation
Arch Street	Alemany Blvd	Randolph Street	
Randolph Street	Arch Street	Saint Charles Avenue	

4 The "Wiggle" is the name local bicyclists have given to the relatively flat bicycle route connecting Market Street at Duboce Avenue to the Panhandle. It avoids hills by "wiggling" with many turns along various streets.

Table 2-2
Changes to the Existing Bicycle Route Network

Street or Path	From	To	Rationale for Network Change
			through this area.
Addition of Network Designation to Existing Facilities			
Avenue of the Palms	Perimeter Path	Avenue of the Palms	Treasure Island addition
Dolores Street	30th Street	San Jose Avenue	Improvement in conjunction with San Jose Avenue improvements provides bicycle route through a lane drop and lane shift
Golden Gate Avenue	Parker Street	Baker Street	New bicycle lanes striped creating a rerouting of Route 20
Illinois Street[5]	16th Street	Cargo Way	Routes changed due to implementation of 3rd Street light rail
Industrial Street	Oakdale Street	Loomis Street	Network improvements addition to Route 25
Loomis Street	Industrial Street	Bayshore Boulevard	Network improvement additions to Route 25
Perimeter Path	Avenue of the Palms		Treasure Island addition
San Jose Avenue[5]	Dolores Street	Chenery Street	Route 45 addition
Terry Francois Boulevard	3rd Street	Illinois Street	Addition to the Illinois Street route - relocation from Third Street.

RECOMMENDED IMPROVEMENTS TO THE EXISTING BICYCLE ROUTE NETWORK AND STUDY AREAS

As outlined in Chapter 1 - Introduction, a list of potential projects created from extensive public comments, staff analysis, remaining, unimplemented projects from the 1997 Bicycle Plan., and public workshops and surveys resulted in more than 2,800 suggestions. Public suggestions were categorized and prioritized by the City and consultants for inclusion within this chapter, but also for a more thorough discussion within the Network Improvement Document.

These recommended improvements could include bike lanes, shared lane arrow markings, traffic signal timing improvement, path resurfacing, etc. Specifics of the potential improvements and studies will be identified within the Network Improvement Document.

The appropriate improvements will vary according to each street's specific condition. Designs from the California Highway Design Manual and the City's Supplemental Design Guidelines (Appendix A) are approved for application to a street, subject to review by DPT and approval through the normal BOS legislative process, where required. Other improvements or variations on these approved designs may be considered for trial application after review by the Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT) and after the necessary environmental approval is obtained.

Table 2-3 and Figure 2-5 present recommended improvements and study areas for the existing bicycle route network.

Table 2-3
Recommended Improvements and Study Areas for the Existing Bicycle Route Network

Street or Path	From	To	Existing Bicycle Route Number
11th Street	Market	Mission	25
14th Street[5]	Market	Dolores	30
19th Avenue[5]	Buckingham	Holloway	75
20th Street	Wawona	Irving	75
22nd Street	Valencia	Potrero	44
23rd Street	Valencia	San Bruno	n/a
2nd Street[5]	Market	King	11
34th Ave Path	Polo Field Path	Lincoln Way	85
5th Ave Path	Martin Luther King	Lincoln Way	65
5th Street[5]	Market	Townsend	19
7th Avenue	Kirkham	Lawton	65
Alemany/Silver Corridor	*	*	*
Battery East Path	Lincoln Boulevard	Golden Gate Bridge	202
Battery Street	Embarcadero	Market	n/a
Bay Bridge	*	*	*

Table 2-3
Recommended Improvements and Study Areas for the Existing Bicycle Route Network

Street or Path	From	To	Existing Bicycle Route Number
Bayshore Corridor[5]	*	*	*
Bayview/Hunters Point	*	*	*
Bosworth/O'Shaughnessy Streets	San Jose	Portola	55
Broadway[5]	Hyde	Mason	10/210
Cayuga Street	Geneva	Lyell	45
Cesar Chavez Corridor[5]	*	*	*
Chain of Lakes	Fulton	John F Kennedy	730
Cheery Street	30th	Elk	45
Columbus Street	Washington	Beach	11
Conservatory West	Arguello	John F Kennedy	65
Corbett Street	Clayton	Market	40/50
Division Street	King	11th	36
Embarcadero Promenade	North Point	King	5
Eureka Valley/Mission Corridor (16th/17th Streets)[5]	*	*	*
Evans Avenue	3rd Street	Cesar Chavez	68
Fell Street			30
Fisherman's Wharf	*	*	*
Fort Mason Tunnel	Aquatic Park	Laguna	2
Geneva Avenue	Mission	San Jose	90
Greenwich Street	Van Ness	Lyon	6
Grove Street	Van Ness	Polk	20
Holloway Avenue	SF State	City College	90
Horseshoe Court Path	Fulton	Conservatory East	765

Table 2-3
Recommended Improvements and Study Areas for the Existing Bicycle Route Network

Street or Path	From	To	Existing Bicycle Route Number
Indiana Street	23rd Street	Cesar Chavez	7
John F Kennedy	Great Highway	Stanyan	30
Kirkham Path	Lower Great Highway	Great Highway	40
Kirkham Street	6th Avenue	Great Highway	40
Laguna Honda Boulevard[5]	Clarendon	Woodside	65
Lake Merced Boulevard	Skyline	John Muir	85/86/885
Lake Merced Path			91/95
Lake Street	3rd Avenue	Arguello	10
Lyell Street	Alemany	Bosworth	45
Marina Boulevard	Laguna	Lyon	2
Mariposa Street	Pennsylvania	Indiana	23
Market Street[6]	Steuart	Octavia	50
Market Street[5]	Octavia	17th	50
Masonic Corridor[5]	*	*	*
McAllister Street	Market	Masonic	20
Mission Creek Bikeway	16th Street	4th Street	n/a
Mission Street	Embarcadero	14th Street	n/a
Monterey Boulevard	San Jose	Junipero Serra	70

5 These corridors may require additional study and the further involvement of numerous City agencies and other jurisdictions. These potential projects received priority attention by the consultant team and the SFBC. Early design concepts were developed so that the SFBC could begin early outreach on these potential projects. This work will be reflected within the Network Improvement Document.

6The SFCTA examined pedestrian, bicycle, and vehicle circulation issues along Market Street. An Action Plan was developed describing a series of complementary, low cost improvements that could be implemented in the next one to five years. The full report can be found at http://www.sfcta.org/marketstreet.htm

Table 2-3
Recommended Improvements and Study Areas for the Existing Bicycle Route Network

Street or Path	From	To	Existing Bicycle Route Number
Oakdale Avenue[5]	3rd Street	Bayshore	170/07
Ocean Boulevard	Mission	Junipero Serra	84/90
Octavia Corridor[5]	*	*	*
O'Shaughnessy Path	Portola	Bosworth	55
Page Street	Stanyan	Market	32
Panhandle Path	Ashbury	Clayton	30
Panhandle Path	Baker	Baker	30
Point Lobos Street	Great Highway	48th Avenue	95
Polk Street[5]	Market	McAllister	25
Polo Field Bicycle Path	Polo Field	34th Ave Path	85
Portola Way[5]	Corbett	Sloat	50
Post Street	Market	Steiner	16
Presidio Boulevard	Pacific	Geary	55
Romain Overpass	Market Street	Market Street	44
San Jose Corridor	*	*	*
Silver Avenue	Alemany	Oakdale	70
Sloat Boulevard	19th Avenue	La Playa	50
Stockton Street	Broadway	Market	17
Sunset Path	Ocean	Lake Merced	85/86
Sutter Street	Fillmore	Market	16
The "Wiggle"	Church	Page	30
The Embarcadero	Northpoint	Taylor	n/a
Townsend Street[5]	Embarcadero	Division	36
Transbay Terminal	*	*	*
Treasure Island and Yerba Buena Island	*	*	*

Table 2-3
Recommended Improvements and Study Areas for the Existing Bicycle Route Network

Street or Path	From	To	Existing Bicycle Route Number
Vicente Path	Lower Great Highway	Great Highway	60
Webster Street	Duboce	Grove	345
Winston Drive	Junipero Serra	Lake Merced	86
Woodside Avenue	Laguna Honda	Portola	60

* Denotes recommended study areas. These projects may trigger extensive environmental reviews and must be addressed in a much broader planning context, due to the complexity of the projects and the involvement and responsibilities of numerous City agencies and other jurisdictions. For each study area, it is recommended that a complete transportation study; be conducted once funding is secured.

RECOMMENDED STUDY STREETS FOR POTENTIAL INCLUSION IN THE BICYCLE ROUTE NETWORK

Action 2.3 Complete the required design and engineering for improvements to Recommended Study Streets and implement in conjunction with the DPW's Five Year Proposed Utility Excavation and Paving Plan, if feasible.

The streets listed in Table 2-4 should be studied for potential inclusion in the Bicycle Route Network. These streets are also depicted in Figure 2-5. This list will be prioritized to correspond to the DPW's Five Year Proposed Utility Excavation and Paving Plan. As streets are being resurfaced, bicycle improvements to those streets should be studied for concurrent implementation.

As stated above, this list was shaped by extensive public comments, public workshops, and surveys resulting in more than 2,700 suggestions. Public suggestions were categorized and prioritized by the City and consultants for inclusion within this chapter, but also for a more thorough discussion within the Network Improvement Document. The major difference between the following list and the one above is that the following list contains streets that are not part of the current bicycle network.

Table 2-4
Recommended Study Streets for Potential Inclusion In the Bicycle Route Network

Street Name	From	To
18th Street	Diamond Street	Harrison Street
25th Avenue	Lincoln Way	Kirkham Street
Baker Street	Turk Street	Sacramento Street

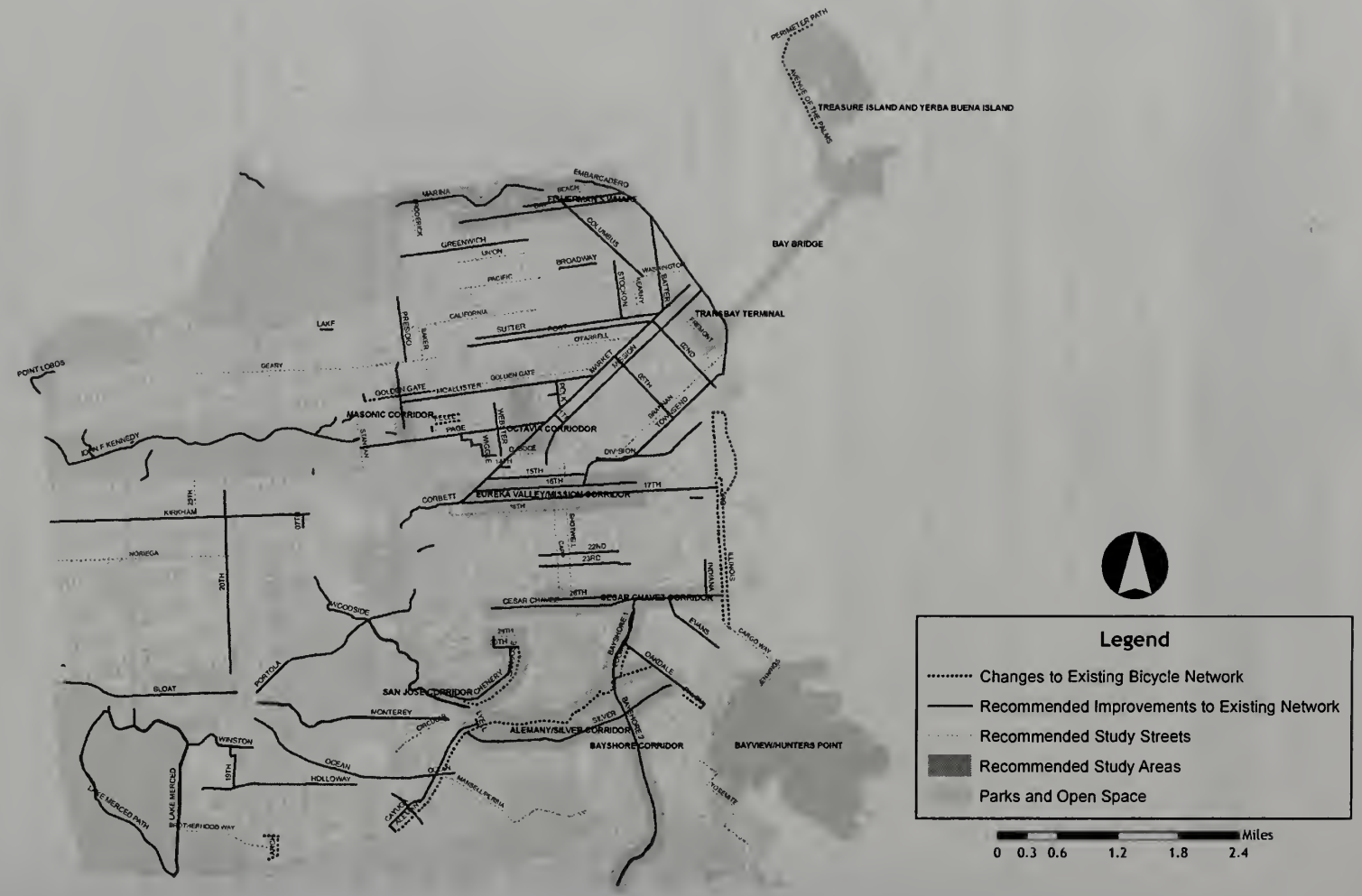
Table 2-4
Recommended Study Streets for Potential Inclusion In the Bicycle Route Network

Street Name	From	To
Brannan Street	Embarcadero	Division Street
Broderick Street	Francisco Street	Marina Boulevard
Brotherhood Way	Lake Merced Boulevard	Arch Street
California Street	Masonic Avenue	Van Ness Avenue
Capp Street	26th Street	15th Street
Circular Avenue	Monterey Boulevard	Havelock
Duboce Park Path	Noe	Waller
Fremont Street	Howard Street	Harrison Street
Geary Boulevard[7]	Divisadero Street	25th Avenue
Golden Gate Avenue	Baker Street	Market Street
Kearny Street	Market Street	Columbus Avenue
Mansell/Persia Street	Mission Street	University
Noriega Street	La Playa Street	19th Avenue
Oak Street	Scott Street	Baker Street
O'Farrell Street	Polk Street	Market Street
Pacific Avenue	Polk Street	Steiner Street
Shotwell Street	14th Street	26th Street
Stanyan Street	Fulton Street	Frederick Street
Union Street	Steiner Street	Van Ness Avenue
Washington Street	Embarcadero	Columbus Street

[7] When Geary Boulevard is studied for potential inclusion in the Bicycle Route Network, this should be done as part of a larger Geary Boulevard Bus Rapid Transit (BRT) study.

Figure 2-5:
Changes and Recommended Improvements to the Existing Bicycle Network; Recommended Study Areas and Streets for Potential Bicycle Network Inclusion

Data Source: San Francisco DPW, DPT



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BICYCLE AND TRANSIT POLICY

Action 2.4 Implement the Transit First Policy's bicycle and transit elements.

San Francisco's Transit First Policy supports pedestrians and bicycles in addition to transit, as important non-automobile components of a balanced transportation system. This discussion of bicycle facilities on transit routes and the related section in the Supplemental Design Guidelines address the operational complexities identified by City staff when planning for shared street use by transit vehicles and bicyclists. It should be noted that San Francisco's "Transit First" Policy (Section 16.102 of the City Charter) includes the following:

- "Within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile;"
- "Decisions regarding the use of limited public street and sidewalk space shall encourage the use of public rights of way by pedestrians, bicyclists, and public transit;" and
- "Bicycling shall be promoted by encouraging safe streets for riding, convenient access to transit, bicycle lanes, and secure bicycle parking."

MTA plans, such as this Plan and Muni's Vision for Rapid Transit, guide implementation of the Transit First Policy. Bicycle projects on Muni routes should be considered on a case-by-case basis, with good technical analysis and mitigation measures appropriate to each particular situation. Implementation of this document is one of the ways of implementing the Transit First policy.

The challenge for the MTA is to prioritize transit and bicycle projects, while accommodating the flow of other people and vehicles. MTA staff encourages this Plan's general vision to increase the number of daily bicycle commute trips in San Francisco to 10% by 2010. MTA staff will do everything possible to ensure that impacts of bicycle projects on transit are successfully mitigated. The MTA is focused on enhancing the existing bicycle network to create a truly complete and robust network. One of the benefits of a bicycle network is that it generally has excess capacity, so that bicycle ridership can grow dramatically without expansion of the infrastructure. The MTA will look to implementation of actions in this Plan to increase the bicycle transportation mode split.

Appropriate agencies should work closely together to identify and mitigate, where possible, any significant negative impact on transit that could potentially result from a bicycle improvement project. Working together to create world class facilities for both transit riders and bicyclists will result in greater mode shifts to more sustainable forms of transportation, which would ultimately benefit both transit riders and bicyclists.

When bicycle facilities are proposed on streets where non-Muni transit service is operated (such as Samtrans or Golden Gate Transit), DPT should work with these transit agencies.

BICYCLE FACILITIES ON TRANSIT ROUTES

The purpose of this section is to provide a preliminary framework to guide Muni, DPT, the Planning Department, and other agencies in the selection of specific streets for shared Muni

and bicycle use (when other streets are not viable or less preferable for bicycles).

When a bicycle facility or project is proposed for an existing transit route, the DPT Bicycle Program staff will review existing transit operations data. They will then present Muni Planning staff with a project description to initiate a project-specific review and identify specific data needs. Muni and DPT staff will work collaboratively to determine the agreed upon specific steps required to demonstrate project viability. Muni Planning staff will be available to present data to assist in any analysis.

It is very important that Muni and DPT agree on the technical analysis and "before" and "after" data required that is appropriate to each particular situation. As a result, both agencies will obtain agreed-upon definitive evidence to conclude whether or how the bike lanes affect Muni performance and if bicycles and transit vehicles can coexist well on this street.

A proposed bicycle facility should not create significant negative impacts to transit operations (i.e.: transit travel times or schedule adherence). However, the project's bicyclists' safety improvements must also be considered. Mitigation measures (along the proposed bicycle facility or elsewhere along a Muni route) should be implemented where possible to encourage minimal transit service degradation and transit service improvements, while improving the bicycling environment along the corridor.

If significant transit impacts are identified and the project will make a significant improvement in bicyclists' safety (based upon similar bicycle facility projects), then the decision on project implementation will need to be made by the appropriate City policy-makers. The MTA looks to the BOS and the Mayor's Office to support the MTA's efforts to effectively implement the Transit First policy. Figure 2-7 shows corridors having potential opportunities and/or constraints for shared bicycle and transit facilities. This map should be consulted when planning bicycle facilities.

Figure 2-8 shows existing transit stations and transit priority streets. This map should also be consulted when planning bicycle facilities.

BICYCLES AND TRANSIT DESIGN GUIDELINES

The Supplemental Design Guidelines (Appendix A or www.bicycle.sfgov.org) should be followed for shared bicycle and transit facilities. Additional transit related diagrams may be added in the future to the Supplemental Design Guidelines as required.

ALLOWING BICYCLES IN BUS-ONLY LANES ("EXCLUSIVE BUS LANES")

Action 2.5 Select a new or a modified exclusive bus lane to conduct a before and after study, in conjunction with Muni, to allow bicycles.

Action 2.6 Amend TC Section 31 to allow bicyclists in exclusive bus lanes, when they are right-curb lanes; except on one-way streets.

Various cities around the world have engineered shared bus/bicycle lanes to afford both

transportation modes with dedicated space separate from motor vehicle traffic on city streets. While this may improve conditions for bicycles and transit by reducing conflicts with automobiles, it also has the potential to increase conflicts between bicycles and buses; therefore, safety issues must be thoroughly addressed. (See Action 5.8 in Chapter 5 for a further discussion of bicycle and bus safety issues.) This Plan incorporates a general standard for shared bus/bicycle lanes in the Supplemental Design Guidelines, bringing San Francisco closer to implementation of such facilities.

Shared bus/bicycle lanes represent only one design solution. Many streets can accommodate bus transit service and dedicated bicycle facilities. This more typical arrangement has been thoroughly discussed during the development of this Plan and many of the engineering challenges have been addressed in the Supplemental Design Guidelines.

TC (Section 31) establishes exclusive bus lanes with the intent of excluding other vehicles, including bicycles from using them. Additions, deletions, or changes to exclusive bus lanes must be legislated by the BOS. It should be noted that "exclusive bus lanes" are often designated as the far right traffic lane, which is where bicyclists are required by law to ride[8]. This can create confusion for bus operators, bicyclists and motorists. It is suggested, pending the results from a trial program, that legislation be drafted to allow bicyclists in exclusive bus lanes, when it is a far right lane. Since the California Vehicle Code (CVC) permits cyclists to ride near the left-hand curb of a one-way street with at least two traffic lanes, it is recommended that the any amendment to TC Section 31 only apply to two-way streets.

Additionally, on a case-by-case basis, officially designated, signed bus/bike lanes should be established for routes where needed as described in the Supplemental Design Guidelines.

8 CVC 21202. (a) Any person operating a bicycle upon a roadway at a speed less than the normal speed of traffic moving in the same direction at that time shall ride as close as practicable to the right-hand curb or edge of
the roadway except under any of the following situations:
(1) When overtaking and passing another bicycle or vehicle proceeding in the same direction.
(2) When preparing for a left turn at an intersection or into a private road or driveway.
(3) When reasonably necessary to avoid conditions (including, but not limited to, fixed or moving objects, vehicles, bicycles, pedestrians, animals, surface hazards, or substandard width lanes) that make it unsafe to continue along the right-hand curb or edge, subject to the provisions of Section 21656. For purposes of this section, a "substandard width lane" is a lane that is too narrow for a bicycle and a vehicle to travel safely side by side within the lane.
(4) When approaching a place where a right turn is authorized.
(b) Any person operating a bicycle upon a roadway of a highway, which highway carries traffic in one direction only and has two or more marked traffic lanes, may ride as near the left-hand curb or edge of that roadway as practicable.

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Figure 2-6:
Overlap of Existing Bicycle Network and Transit Corridors

Data Source: San Francisco DPW, SFCTA

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Figure 2-7:
Overlap of Existing Bicycle Network and Transit Priority Streets

Data Source: San Francisco DPW, SFCTA

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ADDITIONAL CITY POLICIES

The following are City policies that affect bicycle facility implementation. Their inclusion within Chapter 2 - Bicycle Network demonstrates the impact that these policies could have on expanding and refining the Bicycle Route Network

REVIEW MULTI-LANE STREETS FOR NETWORK INCLUSION

Action 2.7 Review multi-lane streets that currently have excess capacity (i.e. less than 600 vehicles per lane per hour during the peak-hour). The removal of a travel lane due to excess capacity could assist in accommodating bicycle lanes or other bicycle-friendly treatments.

DPT currently reviews multi-lane streets for Bicycle Route Network inclusion and possible bicycle lane striping. An example is Alemany Boulevard (Brotherhood Way to the Mission Street overpass) where bike lanes are being designed. The genesis for review of a multi-lane street can occur from a variety of sources: DPW's planned street resurfacing, recommendations from advocacy groups, or internal DPT project review and design. Additionally, as advances in Intelligent Transportation System (ITS) technology continue, they should be employed to improve the effectiveness of existing multi-lane streets so that the addition of bicycle facilities may be possible, where appropriate.

However, it should be noted that extra capacity on arterial streets allows for the management of traffic volume fluctuations. This is particularly relevant when there are parallel residential streets, bicycle routes, or transit routes. Diversions or restrictions that force traffic volumes onto residential street, bicycle routes, or transit routes should be avoided.

RECOMMENDED AMENDMENTS TO LOS STANDARDS AND METHODOLOGIES

Action 2.8 Adopt the SFCTA LOS TWG's recommended revisions to San Francisco's LOS standards and methodologies such that they better respond to the multimodal nature of San Francisco's transportation system, specifically addressing bicycles.

LOS measures are used to predict impacts of proposed projects on the transportation system. Existing LOS standards and methodologies used by the City are focused primarily on automobile travel, secondarily on transit travel, and very little on bicycle and pedestrian travel.

The SFCTA adopted a Strategic Analysis Report (SAR 02-3) "Transportation Level of Service (LOS) Methodologies" in December 2003. This report concludes that conventional LOS measures, and the current process for evaluating transportation projects, are not consistent with the City's General Plan policy guidance toward development of a balanced, multi-modal transportation system. Specifically, they conflict with General Plan Policy 10.1, which calls for the City's transportation system to be assessed in terms of the movement of people and goods rather than vehicles. Furthermore, the City's LOS measures do not incorporate factors most important to bicyclists and provide limited acknowledgement of the environmental benefits of bicycling.

A LOS TWG, recommended in SAR 02-3, began meeting in June 2004.[9] It consists of representatives from the SFCTA, DPT, Muni, the Planning Department, Caltrans, the Association of Bay Area Governments (ABAG), a transportation consultant, an academic researcher, bicycle and pedestrian advocates, and a California Environmental Quality Act (CEQA) expert form the City Attorney's Office. When the LOS TWG completes its work, it will present its recommend revisions to current City LOS standards and methodologies (a refined version of SAR 02-3's recommendations) to the SFCTA Board for approval and action. The LOS TWG should make recommendations for amending existing LOS methods to better reflect the multimodal nature of travel in San Francisco. Their work will be done in two phases, with recommendations at six and twelve months. To implement any new recommended methodologies, the Planning Commission would have to adopt these new methodologies in its revised Guidelines for Environmental Review.

Streamlining the environmental review process would reduce the time needed for bicycle project delivery and would help reduce costs, as well.

TRAFFIC CALMING AND THE BICYCLE NETWORK

Action 2.9 Define and identify "bicycle arterial streets," conduct public outreach, and seek a Municipal Transportation Agency (MTA) policy decision to modify the Traffic Calming Guidelines.

In 1998, the SFCTA led a citywide effort to establish Traffic Calming Guidelines. In February 2001, a new section in DPT's Traffic Engineering Division, the Livable Streets - Traffic Calming Program, was created to implement these Guidelines.

The 1997 San Francisco Bicycle Plan included specific recommendations for bicycle related traffic calming measures to be implemented by DPT's Bicycle Program. However, since the creation of the DPT's Traffic Calming Program, all traffic calming projects have been managed by the DPT's Traffic Calming Program, with the DPT Bicycle Program serving in an advisory role. Traffic Calming projects must follow the approved Traffic Calming Guidelines.

The Traffic Calming Guidelines define applicable traffic calming measures and the procedure for their possible implementation. The Guidelines specify that certain measures can only be deemed acceptable after the design details have been field-tested and approved by the necessary stakeholders.

The current San Francisco Traffic Calming Program employs a three-track approach to calming City streets. They range in their aggressiveness and goals.

The **Arterial Track** seeks to make arterial and commercial streets more pedestrian-friendly and improve intersection safety, but does not employ vertical deflection devices such as speed humps and cushions or raised intersections. The Arterial Track streets are treated in a corridor approach, rather than with site specific measures.

9 Information regarding the SFCTA's LOS TWG can be found at http://www.sfcta.org/SARs.htm.

The **Local Streets Track** includes both area-wide and site-specific approaches, depending on the particular location, safety issues and traffic. The Local Streets Track employs additional measures to reduce the negative effects of motor vehicle traffic on these local streets, including vertical deflection measures.

The **School Area Track** is the most comprehensive, tackling streets where the largest numbers of children walk to and from school. Traffic calming of school areas takes both an area-wide and a site-specific approach. Since children are some of the most vulnerable pedestrians, this track takes a more aggressive approach to creating self-enforcing streets in school areas.

Table 2-5
Traffic Calming Measures with Specific Applications

Street Type	Street Trees	Pavement and Crosswalk Treatments	Rumble Strips	Speed Humps	Longer Speed Humps / Speed Tables / Raised Crosswalks	Curb Bulbs	Chicanes	Median Islands	Traffic Circles	Street Narrowing / Sidewalk Widening	Angled Parking	Diverters / Forced Turns and Street Closure
Arterial	✓	*	*[1]	X	*	✓	X	✓	*[2]	✓	*	X
Commercial	✓	*	X	*	*	✓	✓	✓	✓	✓	*	X
Local & School	✓	*	X	*	*	✓	✓	✓	✓	✓	*	*[3]

✓ - acceptable; X - not acceptable; * - design details/field testing will determine acceptability

[1] Rumble strips may be acceptable at the end of freeway exits or on certain arterial streets that are not residential or commercial.
[2] Modern roundabouts may be appropriate in limited cases on certain arterials, but not in the first stages of the program.
[3] May be appropriate as a last resort on certain local streets that experience cut-through traffic.
Note: Stop signs are not advisable as a traffic calming measure unless otherwise warranted.

The Traffic Calming Guidelines were established through a comprehensive citywide effort, with input from many community groups, including the SFBC and BAC. These guidelines were adopted by the MTA Board, and any changes to these Guidelines would require additional public outreach and MTA Board approval. The first step in this process would be to define "bicycle arterial streets" and then identify which bicycle routes meet this definition. The 1997 Bicycle Plan's "bicycle priority streets" is a good starting point. However, since this Plan predated the formation of DPT's Livable Streets - Traffic Calming Program and the Traffic

Calming Guidelines, the selection of these "bicycle priority streets" needs to be reconsidered in terms of a new definition of "bicycle arterial streets." The "bicycle priority streets" definition should take San Francisco's Transit First Policy into account and be incorporated into the City's General Plan.

SUPPLEMENTAL DESIGN GUIDELINES

Action 2.10 Implement Supplemental Design Guidelines on specific Recommended Network Improvement projects with the appropriate level of analysis and study.

The Supplemental Design Guidelines were developed as a part of this Plan by the DPT Bicycle Program staff and the Alta Consultant Team. They were reviewed by the project Technical Advisory Committee and approved by ISCOTT. The Supplemental Design Guidelines are intended to provide City staff with a more detailed and varied set of tools to apply when improving the Bicycle Route Network.

The Supplemental Design Guidelines complement the San Francisco Bicycle Plan. These design concepts are intended to supplement the design guidelines for typical bikeway situations provided in Caltrans Highway Design Manual (HDM) Chapter 1000, the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, and the Federal Manual of Uniform Traffic Control Devices (MUTCD) 2003, Part 9 Traffic Controls for Bicycle Facilities. These treatments draw upon creative solutions in use in other locations in California, other states, and European cities.

These designs are conceptual, and when applied to specific situations, their application must be reviewed further on a case-by-case basis. It should be noted that for several of the designs, more than one option is presented. In these cases, ultimately one preferred design should be selected. Strong design guidelines will allow the City of San Francisco to improve the quality of the Bicycle Route Network by applying the highest standard of bicycle safety, comfort, and convenience.

Caltrans HDM Chapter 1000, AASHTO Guide for the Development of Bicycle Facilities, and the MUTCD should be the primary reference and the use of the Supplemental Design Guidelines-should be supplemental - as its name implies.

The Supplemental Design Guidelines are included as Appendix A and can be found on DPT's web site at: www.bicycle.sfgov.org.

SHARED LANE PAVEMENT MARKING

Action 2.11 Prioritize phased application of the Shared-Use Pavement Arrow on appropriate existing signed bicycle routes, wide curb lanes, and newly designated routes where bicycle lane implementation is demonstrated to be infeasible.

One Supplemental Design Guidelines of particular note is the Shared Lane Pavement Marking (Sharrow). Until recently, there was no approved pavement marking for Class III bikeways (signed bicycle routes without bicycle-specific pavement markings, where cyclists and motorists shared the same, often narrow, lanes). As a result of an experiment approved by the CTCDC, there is now a marking for shared lanes on Class III bikeways (approved by the CTCDC August 12, 2004), which is included in the Supplemental Design Guidelines. However, it must now be approved by Caltrans for implementation.

As Class III bikeways constitute the bulk of San Francisco's Bicycle Route Network, the potential application and benefit of Sharrows is significant. From the study referenced above, installation of the bicycle-and-chevron design Sharrow demonstrated that:

- Cyclists rode further away from the door zone;
- Motorists shifted to the left and gave more room when passing cyclists;
- Fewer cyclists rode on the sidewalk; and
- Fewer cyclists rode the wrong way on the street.

While the Sharrows were studied in mid-block locations, they may also be effective in other situations, such as intersection approaches with multiple turn lanes where a through cyclist should be in the middle of an optional through/turn lane. Further study of the Sharrow in these types of situations, along with development of warrants to determine which Class III bikeways will have Sharrows installed, should be undertaken by the DPT.

The report "San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety" describes the experiment and can be found in Appendix B. Any further study and implementation of this pavement marking should be coupled with an education campaign when installation occurs.

BICYCLE FACILITY IMPLEMENTATION STEPS

A. PROJECT IMPETUS

A project can originate from several different sources:

- Noted by staff as a necessary safety improvement;
- Recommended by the Bicycle Plan;
- Requested by the public or advocacy group;
- Requested by an elected official; and
- Opportunity presented by another project or another agency.

B. BICYCLE PROGRAM STAFF ANALYSIS

Once a project is initiated, typical questions and data collection that Bicycle Program staff initiate are:

Design

What is the current condition of the facility and what is being proposed?

Data: drawings and descriptions of current and proposed conditions

Problem/Solution

What is the problem and how does this project solve it?

Data: bicycle counts, collision history, prevailing motor vehicle speeds, knowledge of route and existing bicycle facilities in the project area, and consideration of alternative solutions or routes

History/Background

What is the history of transportation related requests in the area?

Data: knowledge of correspondence related to the project (requests for bicycle facilities, traffic calming, tow-away changes, etc.) and existing plans for the area

Traffic Capacity

Has capacity changed in any way?

Data: recent traffic volumes

Can significant LOS/travel time degradations be mitigated?

Data: proposed traffic signal changes, tow-away lanes, turn restrictions, and motor vehicle lane changes

What effect will changes have on neighboring streets?

Data: knowledge of area and potential cut-through traffic routes

Transit

Is this project on a transit route?

Data: what route(s), what transit headway, use by "dead head" routes (transit vehicles not carrying passengers, usually operating to/from transit yards), and location of any tracks

How will it affect transit?

Data: travel time and delay studies, width of lanes used by transit vehicles, location of and effect on transit stops or zones, and accommodation of transit turns

Parking

Are there any parking changes?

Data: existing vs. proposed parking, number of parking spaces gained/lost, and changes in colored curb zones

What is the current parking occupancy for various times of day?

Data: parking survey

What is the public response to parking changes?

Trucks

Is the project on a truck route?

Data: approximate frequency of truck use, width of lanes used by trucks, and accommodation of truck turns

Pedestrian Concerns

Will this project improve or degrade pedestrian access or safety?

Data: traffic speed data (if the project may have a traffic calming effect) and planned pedestrian or DPT Livable Streets projects

Land Use

How will this project fit in with existing land use?

Data: knowledge of land use and location of heavily used driveways or loading docks

Other Departments or Agencies

Does this project require outreach to other City departments or non-City agencies?

Data: evidence of outreach and departments' and/or agencies' recommendations

Will street be repaved in near future?

Data: Check DPW paving schedule and modify schedule for bike lane striping as appropriate.

C. ADDITIONAL REVIEW AND ENVIRONMENTAL ANALYSIS

Upon completion of data collection and initial project design, the DPT Bicycle Program reviews the project with other City departments, external agencies, advocacy groups, and internally within DPT to determine if there are any additional data needs or concerns. This review includes conformity to CEQA, the San Francisco General Plan, the Bicycle Plan, and other relevant planning documents.

Depending on the level of environmental impact, either a categorical exemption or a negative declaration is sought by the DPT from the Planning Department. Typically, projects with impacts that include an immitigable change of LOS to E or F would require a full Environmental Impact Report (EIR). Historically, the DPT Bicycle Program has attempted to mitigate the impacts, in the steps above, so that a project would not require a full EIR. Whenever possible, solutions are recommended that require no significant negative impacts on the circulation of other vehicles or pedestrians. In some cases, it is not possible to improve conditions for bicyclists without having some impacts on other modes.

D. LEGISLATIVE PROCESS

The CVC delegates authority for certain traffic changes to local jurisdictions, provided that approval of the governing body (BOS for San Francisco) is obtained. If a proposed bicycle project includes any of these traffic changes, the DPT Bicycle Program drafts the necessary legislation. The legislative process involves the following steps that occur in the order below, unless otherwise specified.

DPT Staff Meeting

The project is discussed at a bimonthly DPT Traffic Engineering staff meeting. Projects may need modification and discussion at more than one meeting.

ISCOTT Meeting

ISCOTT (chaired by a DPT Traffic Engineering staff member and consisting of representatives of DPT, DPW, Police, Fire, Public Health, Muni, City Planning, and other City departments) reviews projects as described below. The intent of ISCOTT is that its members represent and

express their department's position and interests on agenda items. Projects may need modification and discussion at more than one meeting.

ISCOTT considers proposed projects when they are in their final design phase and from an important perspective. ISCOTT reviews projects for functional compatibility to make sure that their final design does not interfere with other current and projected transportation uses, especially the delivery of essential services (ie.: Police, Fire, Muni, etc.). Design details such as precise lane widths and curb heights, exact signage placement, and compatibility with emergency response plans are reviewed by ISCOTT. Since final design details will not be determined by the end of the Bicycle Plan Update process, this type of review is impossible at such an early stage of these projects. Therefore, ISCOTT review is necessary in addition to review by the Bicycle Plan Update Technical Advisory Committee (that represents many, but not all, of the departments represented by ISCOTT). The Bicycle Plan Update process, with interdepartmental cooperation, will greatly reduce the chance that unforeseen issues arise at ISCOTT.

Bicycle Advisory Committee (BAC) Meeting
Prior to the BOS Committee (see below), the BAC should pass a resolution recommending BOS' action on a potential bicycle project. Public comment can be heard at this meeting.

DPT Public Hearing
Prior to this hearing, public notices are posted in the project area and distributed to interested parties. A DPT staff Hearing Officer presides and records public concerns and questions received prior to and at the meeting. Some projects are returned to Traffic Engineering staff for possible modification to address concerns raise at the hearing.

MTA Board Meeting
Additional public comment is heard at this meeting. If the MTA Board does not approve the item, it is sent back to DPT staff for possible modification.

BOS Committee Meeting
Prior to a BOS Hearing, public notices are posted in the project area and distributed to interested parties. Before an item can be heard by the approprate Board Committee, environmental clearance must be obtained. If the Committee does not approve the item, it is sent back to DPT staff for possible modification.

BOS Meeting
Public testimony is not permitted at BOS Meetings for items referred by a BOS Committee (since public testimony was already heard at the Committee meeting). If the BOS does not approve the item (an unusual circumstance, if the Committee approved it), it is sent back to DPT staff for possible modification.

Mayors' Approval
If the Mayor does not approve the item (an unusual circumstance), it is sent back to DPT staff for possible modification.

NOTE:
Trial projects are required to go though this entire process twice: (1) to approve the trial and (2) to approve the permanent facility.

E. IMPLEMENTATION

After the legislative process completion, the project can be implemented. For projects requiring new striping, pavement quality is a major consideration. Generally, new pavement striping would occur after a roadway-resurfacing project. Resurfacing projects are scheduled by DPW using its Pavement Management and Mapping System (PMMS).

F. FUNDING

The above process generally occurs after grant funding has been secured. The MTA Board, BOS Committee, full BOS, Mayor, and Controller must approve a resolution to apply for, accept, and expend funds for all grants, with the exceptions below. This Plan's Funding Section provides more information on funding opportunities and approvals.

Funds for projects from the SFCTA half-cent sales tax (Prop. B and Prop. K) do not require MTA Board approval per current policy of the MTA Executive Director. Sales Tax Project funding approved by a formal SFCTA resolution does not need BOS approval, since the SFCTA and the BOS are comprised of the same members. However, grant funds from other sources require both MTA Board and BOS approval.

MAINTENANCE STANDARDS FOR THE BICYCLE NETWORK

Among other responsibilities, DPW is in charge of cleaning, repairing, and maintaining city streets and sewers; building and maintaining plazas, stairways, and other public areas; coordinating street excavation work; looking after the City urban forest; enforcing litter laws; removing graffiti and illegal signs; regulating street and sidewalk use; and enhancing and protecting the public right-of-way.

The City's streets can be made safer through improved maintenance standards specifically targeting bicyclists' needs. Through its street and sewer inspection program and response to citizens' reports, DPW has developed a standard of street maintenance that primarily responds to the needs of automobiles. Whereas a damaged road surface may seem merely a nuisance to auto users, the same condition can be far more critical for cyclists.

The recommendations in this section do not create new specifications, but are recommended changes to existing DPW and DPT specifications, regulations, and policies. This Plan is not recommending a separate set of documents for bicycle facilities in the public right of way. Whatever changes or refinements are made should be incorporated in the appropriate sections of the City's existing standard specifications, DPT's "Regulations for Working in San Francisco Streets[10]," and DPW's "Regulations for Excavating and Restoring Streets in San Francisco."

DPT, DPW, the BAC, and the SFBC should continue to communicate to be sure that all telephone, Internet, print, and any other public outreach material regarding street surface issues

10 http://www.sfgov.org/site/dpt_index.asp?id=13471#BB7

are current and consistent. Signage with DPW's relevant telephone numbers should also be explored along bike paths or lanes prone to debris build up. It is more efficient for cyclists to contact DPW directly, without first going through DPT, if they want to report street surface related problems. The relevant DPW contacts are:

Pothole filling	695-2100 or potholes@sfgov.org
Problems with street construction/excavation sites	554-SCCC (7222)
General DPW contact - Street and Environmental Services	28-CLEAN (282-5326 or 28clean@sfgov.org

EXISTING POLICIES

Many DPW policies of interest to cyclists are addressed in the 1999 revision of DPW's "Regulations for Excavating and Restoring Streets in San Francisco," adopted following approval of the 1997 Bicycle Plan. These include:

Section 9.1.D Excavation in concrete pavement and parking strips . . . which carry . . . bicycle lanes shall require removal of concrete to an existing joint. Excavation and restoration in these areas shall not result in any new joints in the concrete.

Section 12.4.A ACWS (asphalt concrete wearing surface) on designated bicycle routes must be removed and restored for the full width of the bicycle lane.

Section 6.3.A.3 For major projects (lasting 15 calendar days or longer), notices must be mailed (at least 30 but not more than 60 calendar days before start of work) to the SFBC and the SFBAC when excavations occur on designated bicycle routes.

DPT's "Regulations for Working in San Francisco Streets[11]" (commonly referred to as the "Blue Book" because of its blue cover) that is referenced in the "Regulations for Excavating and Restoring Streets in San Francisco," contains a map of all San Francisco bicycle routes and establishes rules so that work can be done both safely and with the least possible interference with pedestrians, bicycle, transit and vehicular traffic

INTERDEPARTMENTAL MAINTENANCE COORDINATION

Representatives from DPW, DPT, the Department of Recreation and Park, and the Bicycle Program Manager should improve interdepartmental coordination regarding maintenance issues on San Francisco's streets and paths, especially on designated bikeways. This will result in ongoing maintenance or street cleaning issues having a better chance of being aired, prioritized, and monitored for implementation. The Bicycle Program Manager should be alerted and updated to potential changes in transportation patterns that affect the City's commuter and recreational bicycle riding community.

EVALUATE THE "SPOT" IMPROVEMENT PROGRAM

In 1993, a "Spot" bicycle improvement program was initiated to identify and implement various bicycle-related improvements. Suggested small scale bicycling improvements were largely identified through postage-paid mail-in postcards which were distributed through bicycle organizations and bicycle shops in the City. This program was handled by the DPT Bicycle Program and any needed repair work is accomplished by DPT or DPW, with DPT as the lead department.

This method of soliciting cyclists' input has been replaced by reliance on the DPT Bicycle Program website (www.bicycle.sfgov.org) and telephone hotline (415 585-BIKE). If the Spot Improvement postcards are reinstated, they will need to be updated. Additional information, such as the E-mail address and phone number for DPW pothole filling should be included, so tDPW can be contacted directly, without first going through DPT. This should also be done for other agencies where it would be more efficient for them to be contacted directly by cyclists. The Bicycle Program should evaluate the effectiveness of the current website and telephone hotline system of soliciting cyclists' input and determining if it is necessary to update and reinstate the Spot Improvement postcards.

STANDARDS FOR CONTRACT WORK

Action 2.12 Develop and enforce a set of standards that must be strictly adhered to by contractors for street excavation restoration, including a guarantee of one year for replacement of any defective work.

An important step and requirement, towards improving the current road maintenance done for the City through contract work is to develop a set of standards that must be strictly adhered to and enforced by DPW with a guarantee of a minimum of one year for replacement of any defective work. A pre-qualification of acceptable contractors who do City work would go a long ways to ensuring quality, acceptable work.

ACCEPTED STREETS

Action 2.13 Amend DPW's guidelines to allow acceptance of a City street due to its inclusion on the Bicycle Route Network, subject to Board of Supervisor approval

An unaccepted street is one that is not accepted for maintenance at public expense. Current DPW policy[112] is to perform major maintenance only on streets that the BOS has named by ordinance - accepting each specific block for maintenance at public expense. DPW makes exceptions to the acceptance guidelines for streets used as primary thoroughfares, streets used by Muni, streets giving access to public facilities, and streets that would enhance traffic and emergency vehicle movements if accepted. The presence of a bicycle route should be added to the list of reasons to accept streets even though they may be deficient in some physical features. Although proposed in the 1997 Plan, this policy change has not yet been pursued. Amending

12 Unaccepted Streets Surveyed for Acceptance, Executive Summary, Civil Engineering Division SFDPW, November 19, 1994.

DPW's guidelines to allow acceptance of a City street due to its inclusion within the current Bicycle Route Network, would assist potential improvements along Bicycle Route 36, (Townsend Street). It is unclear whether bicycle lanes can legally be striped on unaccepted streets. The City currently sweeps and has established parking controls on some streets that are not resurfaced because they are technically unaccepted. Additionally, a dedicated public right of way is public property whether or not the City maintains it and the City can be held liable for personal injuries and other claims arising from the physical condition of its surface, especially when the existence of improvements invites public use. On the other hand, Article Nine of the Public Works Code holds the owners of lots fronting on unaccepted streets responsible for the streets' maintenance (to its centerline). If the City improves unaccepted streets, this would be a "gift" of public funds and would require Board of Supervisor' approval. The only official way the Board can do this is to accept the street for City maintenance.

PATHWAY MAINTENANCE

Action 2.14 Create a prioritized bicycle pathway inventory that would include: surface condition of every path within the City; signing and lighting inventory and needs of paths; and respective agency responsible for the maintenance of a path.

DPW, the Recreation and Park Department, and DPT should develop a Bicycle Pathway and/or Pavement Maintenance (Rennovation) System. This system would be maintained by one of the above mentioned departments and would incorporate a computer database which could provide reports on the current condition of every bicycle lane and pathway in the City and which City department is responsible for each facility. This database should be kept updated through regular surface condition surveys and would provide a prioritized maintenance list for all City pathways.

In addition, this database should provide signing/lighting needs and maintenance information. When maintenance is scheduled, the responsible department should provide advanced warning of maintenance work and a traffic routing plan or detour route should be established and signed.

STREET CLEANING

Action 2.15 Maintain a minimum of a weekly sweeping schedule (DPW and the Recreation and Park Department) - especially for off-street paths that are not currently cleaned on a regular schedule - in addition to sweeping bikeways whenever there is an accumulation of gravel, glass, sand, etc.

Broken glass, gravel, and debris along roadsides and on paths pose a problem for bicyclists and can cause punctured tires. Streets in San Francisco are cleaned on a regular schedule by DPW except for streets, trails, and paths in parks (maintained by the Recreation and Park Department). DPW owns several small mechanical sweepers ("Green Machines"), sized to sweep paths, in addition to its street-sized mechanical street sweepers. However, several off-street paths are not

currently cleaned on a regular schedule, resulting in debris buildup. This is made worse in areas where people set up camps and leave refuse behind.

When the DPT Bicycle Program notices or is notified of debris on a bikeway, they notify DPW, which then sweeps that bikeway. When the Bicycle Program is aware of an ongoing debris problem on a bikeway (such as the Duboce Avenue Bikeway or the Laguna Honda Boulevard bicycle lanes), they work with DPW to initiate a more frequent sweeping schedule, if possible. As the need for more frequent cleaning of off-street bicycle facilities is brought to DPT's attention (such as the new Cesar Chavez Street Bicycle Bridge and the pathway on south side of Cesar Chavez Street under US 101), DPT will continue to work with DPW to initiate a more frequent sweeping schedule, if possible.

PAVEMENT

Potholes are repaired by filling with asphalt to the level of the surrounding surface. The asphalt is compacted to prevent future settlement and is then inspected for quality compliance. DPW repairs pothole that are their responsibility (including City parks) within 48 hours during week days. If the repair is the responsibility of another agency, DPW will notify that agency. More details on repair of potholes, depressions, bumps, and other defects on city streets can be found on the DPW website (http://www.sfgov.org/sfdpw/pothole.htm).

Existing street composition varies in the City depending on when the street was built. Typically, City streets have an 8-inch concrete base overlaid with 2 to 4 inches of asphalt. Approximately 60 percent of the City's streets have a concrete base. Resurfacing is usually done in the dry season (March 15 to November 15). Crack sealing and pothole patching is done all year.

STREET CUTS

Open street cuts are generally marked with barriers, or covered with two inches of black top asphalt or metal plates. After work is complete, all filled and repaved street cuts should be flush with the adjacent surface. When a street is resurfaced with an asphalt overlay, the existing asphalt in the area adjacent to the gutter lip should be ground to the depth of the asphalt concrete to be placed on the street. Temporary asphalt ramps should be installed at all wedge cuts located at intersections, and pedestrian and bicycle crossings to provide a transition at the vertical differential. When the asphalt concrete is finally placed on the street, the level of the asphalt should match the level of the gutter within a 1/4-inch to eliminate the edge.

DPW's Street Construction Coordination Center (SCCC) oversees street excavation and issues excavation permits. They use the bicycle network electronic map layer to determine which excavation permits involve Bicycle Route Network streets. Locations of current street excavations can be found by street on DPW's website (www.sfdpw.org) by clicking on "Street Construction Coordination Center" and then "Current Excavation Permits."

SCCC is also the City's central clearinghouse that should be contacted about problems with any type of street construction or excavation (554-SCCC (7222)). Note that the City, utility companies, or the approximately twelve private contractors that excavate in the City's streets have 72 hours from the time the excavation-related construction is finished to complete the excavation, then 72 hours to backfill and compact a trench. They then have 72 hours from the

time the excavation is backfilled to replace the pavement base. They have 72 hours after pavement base replacement to restore the finished pavement. DPW has four inspectors assigned to monitor street excavations and five district inspectors to respond to non-construction issues, such as pothole reports. DPW's goal is to inspect all large excavation projects of more than 1,000 square feet of street surface two to three times twice a week, although this may not be the current practice.

STEEL PLATES

Utilities and private companies that install utility trenches on streets place steel plates over them. If care is not taken to provide a smooth transition between the plate and the street surface, an abrupt change of road surface will occur.

Steel plates used to cover work in progress may shift position under the movement of heavy trucks and buses, leaving gaps. Being an inch or so thick, the plates themselves have sharp, square edges that lie above the street level. DPW and DPT require that steel plates have beveled edges and non-skid surfaces. The plates must be wedged with wooden wedges to keep them in place, their edges ramped with asphalt (which must be replaced and renewed frequently) to provide a transition to the adjacent roadway, and must be tacked spot welded together if more than one plate is used. The surface of non-skid plates can become worn out and smooth with wear. If worn non-skid plates are used, they are no longer compliant with the City's requirement for non-skid plates.

PATCHING AND PAVING

Action 2.16 Increase the profile of the Bicycle Route Network within DPW's street resurfacing and paving prioritization process.

- San Francisco should adopt stricter paving, compaction, and smoothness standards similar to those of Palo Alto.[13]

- DPW should give bicycle routes higher priority than other streets when developing paving projects

- DPW should require contractors to guarantee their work for a minimum of one year. (NOTE: Article 2.4 Section 2.4.70 of the Public Works Code obligates the owner of the facility causing an excavation to be made in the public right-of-way (ROW) to be responsible to maintain, repair or reconstruct the site of the excavation until the public ROW is reconstructed, repaved or resurfaced.)

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13 Information regarding the City of Palo Alto street maintenance can be found at http://www.cityofpaloalto.org/streetmaintenance/index.html, or by contacting the City of Palo Alto, Public Works Department, Engineering Division, 250 Hamilton Avenue, 6th Floor, Palo Alto, CA 94301. The Palo Alto street maintenance standards are currently being updated. The existing standards are included in Appendix G4 of the 1997 San Francisco Bicycle Plan.

- It is recommended DPW improve enforcement of their standards, published in "Regulations for Excavating and Restoring Streets in San Francisco," to ensure that non-compliant contractors are cited for every violation.

DPW uses a Pavement Management and Mapping System (PMMS) to prioritize street paving based upon a point system. The PMMS uses a numeric "Pavement Condition Score" based on a field inspection of three surface features: cracking, raveling (erosion) and motor vehicle ride quality. This score assesses each block's maintenance need, identifying its just-in-time maintenance time point and its relative priority. The rating system does not replace engineering judgment. The maintenance recommendation is a starting point for the engineering effort. Each block still requires an engineer's on-site assessment of its exact maintenance needs. (The Pavement Condition Score only applies to the pavement condition and does not account for traffic volume, number of citizen street-surface reports, geographic equity, or whether the street is a bicycle route or a Muni route.) The highest priority for street resurfacing is not always streets in the worst condition. Streets that can have their life prolonged without complete reconstruction receive higher priority so they do not deteriorate to the point where they require complete reconstruction, a more costly option.

Streets cannot be resurfaced until all the required utility clearances are received, to ensure that all planned utility work is complete before they are resurfaced. This may often take several years. If a small section of street is in very poor condition and the entire block is not scheduled for repair in the near future, "patch paving" is done. This involves grinding out and replacing the pavement section. It is important that contractors and utilities be held to strict standards regarding annual re-patching and replacing of defective asphalt patches. Asphalt pavement replacement must be flush with surrounding pavement, including any adjacent concrete gutter. It must be inspected up to one year after installation to check for settling and the contractor should replace resurfaced pavement if found defective.

Section 8.3 of the 1999 revision of DPW's "Regulations for Excavating and Restoring Streets in San Francisco" specifies that excavation sites shall be swept at the end of each workday. This avoids leaving loose asphalt materials that can adhere to the existing asphalt or concrete surface.

Section 10 (Trench Backfill Requirements) requires that the top three feet of backfill be compacted to a relative compaction of not less than 95% and material below the top three feet to not less than 90%. Although certified compaction tests must be taken every 200 square feet of excavation or as specified by DPW, this Plan recommends adopting even stricter compaction and smoothness standards similar to those published by The City of Palo Alto. For instance, contractors and utilities need to be held to strict standards regarding re-patching and replacing of defective asphalt patches and be required to guarantee their work for a minimum of one year.[14] Note, however, that Article 2.4 Section 2.4.70 of the Public Works Code already obligates the

14 DPW's trench restoration standard requires that new pavement extend one foot beyond the trench line, but this "T-trenching" is only required on moratorium blocks (those blocks that have been reconstructed, repaved, or resurfaced by DPW or any other owner or person in the preceding five-year period.)

owner of the facility causing an excavation to be made in the public ROW to be responsible to maintain, repair or reconstruct the site of the excavation until the public ROW is reconstructed, repaved or resurfaced. Section 11 details "Pavement Base Requirements" and Section 12 details "Paving Requirements."

UTILITY COVERS AND UNDERGROUND PIPES

All utility covers should be flush with the surrounding pavement. Where underground pipes carry steam (not very common in San Francisco), the asphalt around steam utility covers can deform, causing warped pavement. Maintaining heat resistant concrete pads of at least a three-foot radius from the edge of the cover should stop warping of the asphalt near the edges. If possible, install concrete above submerged steam pipes where applicable, to prevent humping of street surface.

CATCH BASIN GRATES

There are over 68,000 storm sewer catch basins in the City. Many older grates are semi-circular in plan with bars parallel to the direction of travel. Parallel-bar grates have openings that can catch and destroy a bicycle wheel rim. Many bicyclists also swerve to avoid the grates, risking collision with motor vehicles. These grate locations were identified by the Bicycle Program Manager and were replaced by grates with bars perpendicular to the direction of travel to improve safety for cyclists. Sunken catch basin grates should be raised to pavement elevation to improve bicycle safety and enhance smooth riding. This is much more costly, because it requires replacement of the frame that supports the grate.

GUTTERS

Curb and gutter upheavals cause ponding in bicycle lanes. A regular inspection of every linear foot of curb and gutter should identify those that are raised, sunken or that have some vertical differential that would cause ponding, and these should be repaired. Sometimes small asphalt dams are constructed in gutters to divert storm water into catch basins. These should not be constructed and existing ones removed where possible.

RAILROAD TRACKS

Action 2.17 Create an inventory of locations along the Bicycle Route Network that intersect or run parallel to railroad tracks. Appropriate measures should be undertaken to mitigate the impacts of the track crossings to bicyclists. Removal of unused tracks along the Bicycle Route Network should also be undertaken.

Railroad tracks that are no longer used can be removed or covered with asphalt pavement. Removal is preferable, as pavement covering buried tracks often deforms around the underlying tracks. However, for tracks that cannot be removed (such as tracks that have been designated "historic"), specially designed fabric can be placed over them before they are covered so that pavement deformation is minimized. DPW is responsible for removing or covering, unless the

tracks are located within another jurisdiction, such as the Port of San Francisco or the GGNRA. Any track removal within the jurisdiction of the Port of San Francisco must be approved by the Port Commission.

Although some railroad tracks are considered "historic" or may "contribute to the character of the neighborhood," they should be removed or covered if that would improve cyclists' safety. Railroad track removal or covering should be prioritized according to their location and orientation to cyclists' path of travel. Tracks on street most heavily used by cyclists and those at an oblique angle to cyclists' path of travel should receive the highest priority for removal or covering.

A table of suggested railroad track removals was included in the 1997 Plan. Table 2-7 updates this table for the locations where tracks have not been removed. The other tracks listed in the 1997 table - 2nd Street (between King and Townsend Streets), 3rd Street (north of 16th Street), 3rd Street (between Tulare Street and Cargo Way), and Mason Street (between North Point and Francisco Street) have since been removed.

Table 2-6
Status of Locations for Proposed Railroad Track Removal

Railroad Track Location	Status as of August 2004
Carroll Avenue between Arelious Walker Drive (Fitch Street) and Ingalls Street	Removed to just east of Ingalls Street. There are three tracks along Carroll Avenue in the remaining area (between Third and Ingalls Streets). One (track # 528) is currently used for train turn-around. A second (track #593) is regularly used for trains to access a refrigeration company. The third (track # 534) is currently unusable.
Evans Avenue between Rankin and Quint Streets	The tracks running diagonally across Evans Avenue between Rankin and Quint Streets are currently used daily.
Townsend Street between 7th and 8th Streets	The track running from the Caltrain rail yard along the south side of Townsend Street from just east of 7th Street to just east of 8th Street is used daily by Caltrain to turn one train around. Therefore, this section of track can not be removed until other alternatives are made available.
Van Ness Avenue north of Beach Street	The track that curves across the concrete surface of Van Ness Avenue into the Fort Mason Tunnel north of Beach Street has not been removed. However, a portion of the tracks has been covered with asphalt patching. This railroad track is considered historic and cannot be removed. It would have to be covered with a special material, and this material covered with a new street surface. Since this street has a concrete surface, this makes the covering more complex than for an asphalt street.

This list includes all freight railroad tracks, either on the Bicycle Route Network or reported to DPT by the SFBAC and other cyclists.

STRIPING, PAVEMENT LEGENDS AND EDGE LINE MARKINGS

Non-skid surfaces should be employed on all traffic lane lines. DPT currently uses thermoplastic, methyl methacrylate (MMC) and occasionally pavement marking tape for striping.

Glass beads are applied to new thermoplastic and MMC striping as a standard procedure to improve skid resistance and reflectivity. Pavement marking tape is significantly more expensive than thermoplastic and MMC, does not stick well to old surfaces, and is very difficult to remove. The tape is thinner, less slippery, requires less maintenance, and lasts longer. Since MMC is only cost-effective when used on resurfaced or rebuilt roadways, these are the only situations where DPT uses it. Raised pavement markers should not be used to supplement road striping because they present problems for bicyclists[15]. Where edge line raised reflectors are needed for motorists, they should be installed on the motorists' side of the line. DPT has a policy of not using raised pavement markers on striping that crosses a cyclist's path of travel (such as lane guidelines through intersections). Given San Francisco's dense urban character, there are few locations where edge lines with raised pavement markers are used.

TRAFFIC CODE AMENDMENTS

This section deals with City policies, ordinances and legislation that relate specifically to the Bicycle Route Network. Among these items, the ones of most immediate and lasting importance to bicyclists deal with the planning, design, and maintenance of roadways.

Careful attention to policies, ordinances and legislation can help improve the function of the citywide street network for bicycling. The policies, while often minor themselves, can present major obstacles to the safe and legal passage of bicyclists throughout the City.

LEGISLATION

Traffic law in California is regulated by the CVC. Cities and counties may not regulate traffic on their streets, including bicycle traffic, except where they are expressly authorized to do so by the CVC. As part of this state regulation, bicycles are generally required to obey the same rules of the road as motor vehicles. To the extent that San Francisco is allowed to regulate bicycle traffic, it does so through the TC.

This section reviews each of these local regulations, reviews changes enacted since the 1997 Bicycle Plan, and make recommendations for further changes.

15California HDM 1003.2 (2) Raised barriers (e.g., raised traffic bars and asphalt concrete dikes) or raised pavement markers shall not be used to delineate bike lanes.

SAN FRANCISCO TRAFFIC CODE

To provide clear, useful, and uniform regulation with simple administrative procedures to implement modern policies, portions of the TC should be amended.[16]

Recent and Proposed Changes to the Code

- TC Section 110, Protection of Existing Bicycle Facilities. *Added by Ord. 343-98, 11/19/98 (This Code only applies to the streets, lanes and paths on the City's official Bicycle Route Network as defined in the most recent update of the Transportation Element of the San Francisco General Plan. It does not apply to construction zones involving temporary changes to lane widths or lane configurations.).*[17]

- TC Section 96.1 should be revoked due its redundancy with TC Section 96, lack of consideration for children under 13, and its inconsistency with other similar facilities. [18] *(Note that there is no comparable prohibition against bicycling in the Stockton Tunnel.)*

Bicycling on Sidewalks

Bicycling on the sidewalk is generally inappropriate, as the California HDM indicates[19] . Only under the following special considerations should sidewalk bikeways even be considered:

(a) To provide bikeway continuity along high speed or heavily traveled roadways having inadequate space for bicyclists, and uninterrupted by driveways and intersections for long distances.

(b) On long, narrow bridges. In such cases, ramps should be installed at the sidewalk approaches. If approach bikeways are two-way, sidewalk facilities should also be two-way.

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16 Several sources offer guidance for this examination, such as the Model Traffic Ordinance (MTO) of the National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) and the model ordinance published by the National Institute of Municipal Law Officers (NIMLO), an association of city and county attorneys. California Senate Concurrent Resolution 47 of 1973 created a Statewide Bicycle Committee – often referred to as the SCR 47 Committee – to review California bicycle law and recommend revisions, many of which were subsequently adopted. This committee's report includes a Model Bicycle Ordinance (MBO) – also called a Uniform Bicycle Ordinance (UBO) – for the guidance of local jurisdictions. This ordinance is patterned after and is intended to supplement the League of California Cities' Uniform Traffic Ordinance.

17 TC Section 110 Protection of Existing Bicycle Facilities that prohibits the following unless the BOS expressly grants prior approval: The narrowing of right-hand travel lanes with parking, including turn lanes to less than 22 feet or the narrowing of right-hand travel lanes without parking, including turn lanes to less than 14 feet; The narrowing or elimination of any bicycle lanes; The narrowing or removal of bicycle paths; or The addition of traffic lanes, except where such lanes consist of left-turn or right-turn pockets.

18 TC Sec. 96.1 currently prohibits bicycling on walkways in Broadway Tunnel. A sign posted on the walkway at the tunnel's west entrance states "Bicycle Riding Prohibited, § 96.1 T.C." The language of the ordinance and the apparent intent of the sign are to prohibit bicycling on the walkways in the Broadway Tunnel. Since the sign is visible from the roadway, it leads to confusion. However, bicyclists report being cited for bicycling on the roadway. Since the latter behavior is legal, such enforcement is incorrect. Police officers should be instructed on where the prohibition applies and the regulatory signs should be made clearer.

19 California Highway Design Manual can be found at:: http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm

Ideally the following list would be served by off-street Class I Bikeways. However the listed locations also have unique challenges and meet the above mentioned considerations for sidewalk bikeways.

- The northeast side of O'Shaughnessy Boulevard and Bosworth Street (Portola Drive to Elk Street);
- A short segment of the Third Street sidewalk north of US 101;
- A short segment of the north side of Fulton Street (Park Presidio Boulevard to Funston Avenue);
- Aone-block segment on the east side of Bayshore Boulevard (Marin Street to Jerrold Avenue); and
- Walkway within the north bore of the Broadway Tunnel.

If Class I Bikeways are not feasible in the near term, sidewalk bikeways should be explored at these locations.

In general however, sidewalk bicycling should remain illegal per the TC.[20] Enforcement should focus on sidewalk bicyclists, whose speed is greater than that of a pedestrian.

A special case occurs along The Embarcadero. The Embarcadero Promenade is under the jurisdiction of the Port of San Francisco. This wide pathway, adjacent to the roadway, is currently used by cyclists and pedestrians with minimal conflicts. However, bicycles are not specifically permitted on the Promenade. Given the variety and large number of users of the Promenade, it is unlikely that the Port of San Francisco would explicitly permit bicycling on the Promenade, due to potential conflicts and liability issues. Therefore, it is recommended that, while not formalized, the tacit acceptance of bicycle operation along the Promenade is adequate for continued bicyclist use.

20 The CVC allows local jurisdictions to regulate bicycling on sidewalks. TC Sec. 96 makes it unlawful to ride a bicycle on a sidewalk, except at a permanent or temporary driveway or on bikeways established by resolution of the BOS. The TC specifies an exception to this rule: children under 13 riding "sidewalk bicycles" may ride on sidewalks, exercising due care and giving pedestrians the right-of-way, except in front of schools, stores, or buildings used for business purposes – in other words, only in residential areas. TC Sec. 3.15 defines a "sidewalk bicycle" as a bicycle having a wheel diameter of less than 21 inches, including the tire.

3. BICYCLE PARKING

BICYCLE PARKING GOALS AND OBJECTIVES

Goal:

Ensure Plentiful, High-Quality Bicycle Parking to Complement the Bikeway Route Network

Objectives:

- Provide secure short-term and long-term bicycle parking, including support for bike stations and attended bicycle parking facilities at major events and destinations; and
- Provide current and relevant information to cyclists regarding bicycle parking opportunities through a variety of formats.

RECOMMENDED BICYCLE PARKING ACTIONS

The Planning Department is the City agency charged with updating and enforcing the Planning Code. Bicycle parking requirements for land development are part of the Planning Code. Therefore, many of the recommendations in this chapter must be implemented by the Planning Department as the lead agency. City staff should prioritize the following actions to implement the recommendations for increased bicycle parking in San Francisco:

Action 3.1
Consolidate Sections 155.1, 155.2, 155.3, and 155.4 of the Planning Code to provide clearer regulation, guidance and exemptions related to bicycle parking.

Action 3.2
Modify the Planning Department's requirements for bicycle parking so that they are less dependent on automobile parking provisions.

Action 3.3
Amend the Planning Code to increase required bicycle parking for new residential developments and base this requirement on a proportion of dwelling units.

Action 3.4
Ensure that all garage bicycle parking is well advertised at their respective bicycle entrances, and that they are well monitored and secure.

Action 3.5
Increase, through additional staff resources, the Planning Department's monitoring and enforcement of bicycle parking provisions in the Planning Code, especially when issuing building

permits.

Action 3.6

Hold meetings as needed between the Department of Parking and Traffic (DPT) Bicycle Program and Planning Department staff to update citywide bicycle-parking compliance status and review bicycle-parking information posted on the Bicycle Program website.

Action 3.7

Conduct DPT's bicycle-parking training for new Planning Department personnel as needed.

Action 3.8

Ensure that all City leases are negotiated to include the required level of bicycle parking by cooperative efforts of the City Real Estate Department and the DPT Bicycle Program.

Action 3.9

Pursue a citywide policy to provide secure bicycle parking at all City buildings in areas to be specified by the individual agencies, subject to safety regulations and available space, by cooperative efforts of the City Real Estate Department and the DPT Bicycle Program.

Action 3.10

Amend the Planning Code to lower the number of automobile parking spaces required in buildings where Class I bicycle parking is provided.

Action 3.11

Amend the Planning Code to require bicycle-parking in each individual building of large, multiple-building developments.

Action 3.12

Amend the Planning Code to allow tenants to bring their bicycles into buildings unless Class I bicycle-parking is provided.

Action 3.13

Prepare additional guidelines for placement and design of bicycle parking within City rights-of-way, with DPT Bicycle Program, Planning Department, and Department of Public Works (DPW) input. Consider curb-side on-street bicycle parking, and "sleeve" ring racks where inverted "U" racks cannot be accommodated.

Action 3.14

Develop and maintain a DPT, City-distributed, bicycle-parking outreach campaign in print, audio-visual, and web-based formats to provide relevant bicycle-parking information such as garage locations and locker availability.

Action 3.15

Work with the San Francisco Police Department (SFPD) to make bicycle theft investigation a higher priority and to create a better system for returning recovered bicycles to their owners.

INTRODUCTION

The Bicycle Program has made great strides toward realizing its vision of secure bicycle parking reasonably close to cyclists' destinations, thereby facilitating more bicycle trips. During the past several years, it installed approximately 1,100 bicycle racks, brought more than 50 garages into compliance with the City's bicycle parking requirements, and established responsive communication channels for public suggestions and requests. The DPT also reaches out to the community regarding bicycle parking via brochures, posters, and advertising campaigns where appropriate.

More work needs to be done because many office buildings, commercial districts, public transit nodes, and tourist attractions still lack enough proper bicycle parking. This discourages people from cycling because most bicyclists need reasonable protection against theft, vandalism, and in some cases, such as longer-term storage, protection from weather. Bicycle parking is most effective when it is located close to trip destinations, easy to find, and accessible. If quality bicycle parking facilities are not provided, determined bicyclists lock their bicycles to street signs, parking meters, lampposts, or trees, all of which are undesirable because they are often less secure, might interfere with pedestrian movement, and can create liability issues or damage to street furniture or trees.

The San Francisco Planning Code provides a legal framework for bicycle parking requirements. San Francisco has some of the strongest requirements for employee bicycle parking in the country. Planning Code Section 155.1 provides bicycle parking requirements for City-owned and leased building's employees (city government is the largest employer in San Francisco); Section 155.2 requires bicycle parking in buildings with 10 or more automobile parking spaces; and Section 155.4 requires parking for employees and visitors for new and renovated commercial buildings based on square footage. These requirements need to be combined and refined to facilitate more needed improvements.

Figure 3-1 shows the location of publicly available bicycle parking in public and private San Francisco garages based upon the DPT Bicycle Program's database.

This chapter reviews relevant Planning Code Sections, outlines the existing bicycle parking facilities, and makes recommendations for improvements where appropriate.

BICYCLE PARKING POLICY FRAMEWORK

SAN FRANCISCO PLANNING CODE

Action 3.1 Consolidate Sections 155.1, 155.2, 155.3, and 155.4 of the Planning Code to provide clearer regulation, guidance and exemptions related to bicycle parking.

Action 3.2 Modify the Planning Department's requirements for bicycle parking so that they are less dependent on automobile parking provisions.

Action 3.3 Amend the Planning Code to increase required bicycle parking for new residential developments and base this requirement on a proportion of dwelling units.

The San Francisco Planning Code governs the provision of bicycle parking for all building types. Detailed requirements are set for:

- garages (both City-owned and privately-owned);
- City-owned and leased buildings; and
- new and renovated commercial buildings.

Section 155 requires one bicycle parking space for every 20 off-street auto parking spaces and specifies requirements for facility access, facility types, signage, and the number of spaces to be provided per building square footage or per number of employees. Reductions and exemptions may be granted by the City when the provision of bicycle parking facilities would create undue hardship or safety concerns, in which case the landlord may not prohibit bicyclists from storing their bicycles within their office space (Planning Code Section 155.1). The Code also allows for alternative arrangements (such as appropriate off-site parking, or an agreement with a nearby health club to provide access to showers and lockers).

There is currently no specific bicycle parking requirement for residential developments in San Francisco, other than the catch-all requirement that applies to all developments, regardless of primary use, of one bicycle parking space for every twenty auto spaces provided. A lack of dedicated secure bicycle parking is problematic in dense cities such as San Francisco with a high percentage of multi-unit residential buildings. Dwelling units in multi-unit buildings tend to be small, with little available storage space, and residents with bicycles are generally forced to carry bicycles up stairs or take them in elevators and store them in hallways, bedrooms, balconies, or other inconvenient areas designated for other purposes. Recent surveys of San Francisco residents revealed that well over 40% of households citywide own at least one bicycle. Many large developments with several hundred housing units each have been approved recently and will be proposed in the coming years, especially in and around downtown and other central neighborhoods naturally convenient for cycling as transportation. However, under current requirements, there will be a great shortage of convenient residential bicycle storage. Just as convenient and safe storage at workplaces and other destinations are important to encouraging and supporting bicycle usage, so is storage at home.

Most major cities in North America require substantially more secure residential bicycle parking than San Francisco. Vancouver, British Columbia requires 1.25 bicycle spaces per housing unit in all multi-unit buildings. Toronto, Ontario requires 0.75 bicycle spaces per unit in buildings with 10 units or more. Cambridge, Massachusetts and Santa Cruz, California require one bicycle space per unit. Chicago recently updated its downtown zoning to require one bicycle parking space per two auto parking spaces. Portland, Oregon requires one secure bicycle parking space per four housing units. All of these cities prohibit space within dwelling units, balconies, or required open spaces from counting toward bicycle parking. However, they make some allowances for flexible arrangements, such as allowing bicycle parking using wall hooks count as a certain percentage of bicycle parking spaces. Generally, there is a need for consolidation and reorganization of the existing code sections into one organized section of the code, to provide building owners and managers with more clear direction and clearer requirements for bicycle parking.

A detailed review of the existing code should be completed by DPT and the Planning Department to address and improve regulation of bicycle parking in:

- new buildings;
- existing garages requiring new rules and increased enforcement;
- City schools and local colleges;
- residential developments requiring new ratios based on the number and occupancy of housing units; and
- City-owned and City-leased buildings requiring increased bicycle parking capacity.

In addition to this review of existing codes, DPT would like to engage the Planning Department to modify its bicycle parking requirements that are currently tied to the provisions for automobile parking.

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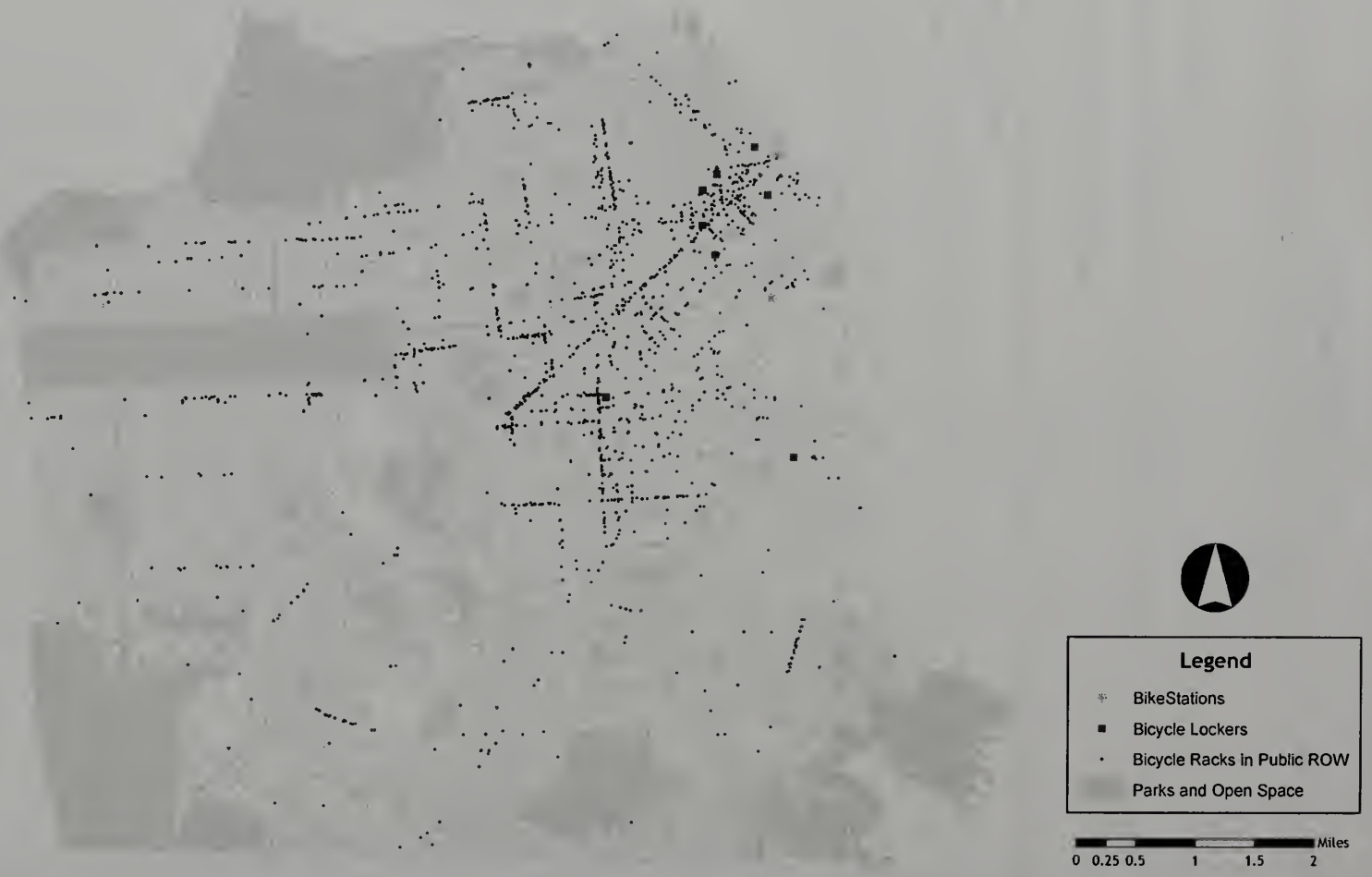
Figure 3-1:
Existing Bicycle Parking

Data Source: San Francisco DPT, DPW



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PARKING GARAGES

Action 3.4 Ensure that all garage bicycle parking is well advertised at their respective bicycle entrances, and that they are well monitored and secure.

Action 3.5 Increase, through additional staff resources, the Planning Department's monitoring and enforcement of bicycle parking provisions in the Planning Code, especially when issuing building permits.

Action 3.6 Hold meetings as needed between the DPT Bicycle Program and Planning Department staff to update citywide bicycle-parking compliance status and review bicycle-parking information on the Bicycle Program website.

Action 3.7 Conduct DPT's bicycle-parking training for new Planning Department personnel as needed.

CITY-OWNED GARAGES

As of early 2004, 17 of the City's 20 garages comply with Planning Code Sec. 155.2, which requires City-owned garages to provide bicycle parking.

Both City-owned and privately-owned garages (but not parking lots) are required to provide either Class I or Class II bicycle parking spaces on the same time basis (i.e., hourly, weekly) as auto parking. Garages may charge fees and must provide adequate signs or notices near garage entrances to advertise bicycle parking. The quantity of spaces required is based on the number of auto parking spaces provided.

Table 3-1
Required Number of Bicycle Parking Spaces in Garages

Number of auto parking spaces	Number of bicycle spaces
< 120	6
120-500	1 per every 20 auto spaces
500+	25 + 1 per every 40 auto spaces, up to max. 50 bicycle spaces

PRIVATELY-OWNED GARAGES

The requirements of Section 155.2 also apply to privately-owned garages. Taking advantage of a unique opportunity to leverage private sector funds, the Bicycle Program obtained a TEA-21

grant to perform outreach to private garage owners to inform them of their obligation to provide (and pay for) bicycle parking hardware and its installation. The Bicycle Program offers technical expertise on preferred locations for maximum security bicycle parking. Due to poor Planning Department enforcement, many private garages do not provide the required bicycle parking and those that do often lack signage.

The Garage Bicycle Parking Report, found on the Bicycle Program website[1], details DPT efforts to educate garage owners and assist in bringing them into compliance. We expect that this document will assist the Planning Department in their enforcement efforts against non-compliant garages.

CITY-OWNED AND LEASED BUILDINGS

Action 3.8 Ensure that all City leases are negotiated to include the required level of bicycle parking by cooperative efforts of the City Real Estate Department and the DPT Bicycle Program.

Action 3.9 Pursue a citywide policy to provide secure bicycle parking at all City buildings in areas to be specified by the individual agencies, subject to safety regulations and available space, by cooperative efforts of the City Real Estate Department and the DPT Bicycle Program.

The most strenuous Planning Code requirements are for City-owned and leased buildings, which are required to provide bicycle parking (Class I and Class II) regardless of the availability of off-street parking.

Table 3-2
Required Number of Bicycle Parking Spaces
in City-Owned and Leased Buildings

Number of employees	Class I spaces	Class II spaces
1-20	2	2
21-40	4	2
41-50	4	4
51-100	5%, 5 min.	6
101-300	5%, 5 min.	8, 50% of which are covered
300+	3%, 16 min.	8, 50% of which are covered

These requirements also apply to libraries, museums, sports facilities and other City-owned public service buildings, with the average peak hour patron load used to determine the number

1 http://www.bicycle.sfgov.org/site/uploadedfiles/dpt/bike/Bike_Parking/All_Garage_Compliance_Report_07_19_04(1).pdf

of spaces required. Funding for these improvements is intended to come from donations, grants and programmatic funding (i.e., not from General Fund revenues or from private building owners).

PRIVATELY OWNED BUILDINGS

The Planning Code requires bicycle parking in new and renovated commercial (but not residential) buildings. The Code specifies requirements for bicycle parking, shower facilities and clothes lockers for both new commercial and industrial buildings and existing buildings undergoing major renovations – whether publicly or privately-owned.

New and Significantly Renovated Buildings

Action 3.10 Amend the Planning Code to lower the number of automobile parking spaces required in buildings where Class I bicycle parking is provided.

Concurrent modifications to on-site parking requirements for both private cars and bicycles could yield benefits for property owners, developers, and bicyclists. A more flexible program allowing building owners and developers options for provision of both car and bicycle parking could address perceived inequities and could result in a more efficient building design with a better mix of appropriate parking.

Large Multi-Building Developments

Action 3.11 Amend the Planning Code to require bicycle-parking in each individual building of large, multiple-building developments.

Although rare in San Francisco, large developments that encompass the area equivalent to several City blocks do occur. When these types of developments do occur, it is strongly suggested that each building be required to provide bicycle parking, rather than the large development being treated as whole with consolidated bicycle parking at one site within the development.

Table 3-3
Required Bicycle Facilities
for New and Renovated Commercial Buildings

Building primary use		Required facilities		
Professional service (sq. ft.)	Restaurants and personal service (sq. ft.)	Bicycle parking spaces	Showers	Clothes Lockers
10,000 – 20,000	25,000 – 50,000	3	1	2
20,000 –	50,000 –	6	2	4

Building primary use		Required facilities		
Professional service (sq. ft.)	Restaurants and personal service (sq. ft.)	Bicycle parking spaces	Showers	Clothes Lockers
50,000	100,000			
50,000 +	100,000 +	12	4	8

Existing Buildings

Action 3.12 Amend the Planning Code to allow tenants to bring their bicycles into buildings unless Class I bicycle-parking is provided.

Building managers are often reluctant to grant access to bicycles due to the perceived negative opinion of other tenants, perceived maintenance costs from bicycle dirt and grease, and fire safety regulations. Experience has shown that if bicycle access to a building is made a condition of signing a lease, these concerns are greatly diminished.

OTHER ON-SITE BICYCLE SUPPORT FACILITIES

Workplace Showers

Workplace showers, especially when combined with bicycle parking, encourage bicycle commuting and benefit other employees who exercise during the workday. Some employers, such as hospitals, have showers and others give health club memberships to their employees or install their own fitness centers with showers. However, showers are not available at most workplaces.

Ordinance 343-98 added Planning Code Section 155.3, "Shower Facilities and Lockers Required in New Commercial and Industrial Buildings Undergoing Major Renovation," requiring shower installation based upon building use and gross floor area. [See Table 3-4]

Table 3-4.
Showers Required in New Buildings

Use	Gross Floor Area of New Construction	Number of Showers Required
Medical, professional, general business offices, financial services, business and trade schools and general business services.	0-9,999 sq. ft.	No requirement
	10,000-19,999 sq. ft.	1
	20,000-49,999 sq. ft.	2
	50,000 sq. ft. and up	4
Retail, personal, eating, and drinking services.	0-24,999 sq. ft	No requirement
	25,000-49,999 sq. ft.	1

Use	Gross Floor Area of New Construction	Number of Showers Required
	50,000-99,999 sq. ft.	2
	100,000 sq. ft. and up	4

REVIEW OF BICYCLE PARKING CLASSES

The following section reviews classes of bicycle parking, the predominant bicycle parking types, and recommends areas of improvement related to administration and facilities management of each parking type.

CLASS I BICYCLE PARKING

Class I bicycle parking is intended to provide secure long-term bicycle storage. Class I facilities protect the entire bicycle, its components and accessories against theft and against inclement weather, including wind-driven rain. Examples include lockers, check-in facilities, monitored parking, restricted access parking, and personal storage.

Class I parking facilities are more expensive to provide than Class II (defined below) facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, Class I bicycle parking should be free wherever automobile parking is free. Lockers are useful at locations where regular bicycle commuters need secure long-term parking, such as at major employment sites or transit stations. Due to problems with vandalism and/or non-bicycle use of lockers, monthly rental lockers are preferred to coin-operated lockers.

San Francisco's bicycle lockers are approximately 65 percent occupied. DPT Staff is currently advertising available spaces through an Internet list server posting and on our website. Existing renters tend to renew their leases year after year. The lockers have generally been trouble-free, except for an occasional problem with the old keys and tumblers.

CLASS II BICYCLE PARKING

Class II bicycle parking facilities provide short-term bicycle parking and include bicycle racks that permit the locking of the bicycle frame and one wheel to the rack and support the bicycle in a stable position without damage to wheels, frame or components.

As of early 2004, the Bicycle Program installed more than 1,100 bicycle racks, with 430 racks installed during 2003 alone. Many of the rack locations are generated by public requests, most often by business owners and managers, in part due to a very successful ad campaign aimed at generating requests that was run on San Francisco Municipal Railway (Muni) buses in 2003. Racks are currently sited based on requests from the public and forecasted usage, although other considerations are being evaluated, such as prioritization where new bicycle lanes are striped and in residential areas.

RACK PLACEMENT

Action 3.13 Prepare additional guidelines for placement and design of bicycle parking within City right-of-ways, with DPT Bicycle Program, Planning Department, and DPW input, including consideration of "sleeve" ring racks where bicycle parking is needed but inverted "U" racks cannot be accommodated and curb-side on-street bicycle parking.

In 1993 the Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT) approved The DPT Bicycle Program's Bicycle Rack Placement Criteria which addressed the physical location of bicycle racks on public sidewalks, and the minimum area required by racks.[2] One of the main objectives of these guidelines was to address the need of maintaining adequate sidewalk clearance width for pedestrians and to limit impediments within the public right-of-way (ROW).

Table 3-5 provides a framework for these additional guidelines, which should be adopted by ISCOTT and incorporated as an amendment to the Bicycle Plan's Supplemental Design Guidelines.

Table 3-5
Additional Rack Placement Guidelines

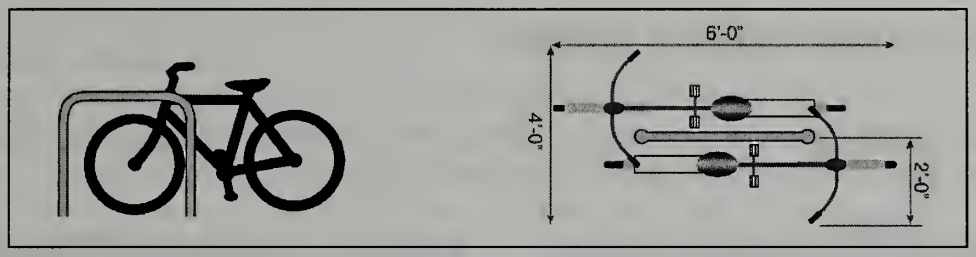
Design Issue	Summary of New Recommended Guideline
Minimum Rack Height	To increase visibility to pedestrians, racks should have a minimum height of 33 inches or be indicated or cordoned off by visible markers. The typical height of racks installed by the DPT Bicycle Program is 36 inches.
Signing	Where bicycle parking areas are not clearly visible to approaching cyclists, signs at least 12 inches by 12 inches should direct them to the facility. The sign should give the name, phone number, and location of the person in charge of the facility, where applicable. Where Class I parking is provided by restricted access, the sign should state that the enclosure must be kept locked at all times.
Lighting	Lighting of not less than one foot-candle illumination at ground level should be provided in all bicycle parking areas.
Frequency of Racks on Streets	In popular retail areas, two or more racks should be installed on each side of each block, up from the current practice of one rack per block side. This does not eliminate the inclusion of requests from the public that do not fall in these areas. Areas officially designated or used as bicycle corridors may warrant the consideration of more racks.
Location and Access	Access to facilities should be convenient; where access is by sidewalk or pathway, curb ramps should be provided where appropriate. Parking facilities intended for employees should be located near the employee entrance, and those for customers or visitors near the main public entrances. (Convenience should be balanced against the need for security if the employee entrance is not in a well-traveled area).

[2] http://www.bicycle.sfgov.org/site/uploadedfiles/dpt/bike/Bike_Parking/BIKEPARKINGGuidelines.pdf

Design Issue	Summary of New Recommended Guideline
Locations Within Garages	Bicycle parking should be clustered in lots not to exceed 16 spaces each. Large expanses of bicycle parking make it easier for thieves to operate undetected. A clearance of 24 inches between adjacent bicycles and 18 inches from walls or other obstructions should be maintained. except where bulb out bicycle parking is provided
Locations Within Buildings	Provide bicycle racks within 50 feet of the entrance. Where a security guard is present, provide racks behind or within view of a security guard. The location should be outside the normal flow of pedestrian traffic.
Locations Near Muni Stops	To prevent bicyclists from locking bikes to Muni bus pole stops - which can create access problems for transit users, particularly those who are disabled - racks should be placed in close proximity to Muni stops where there is a demand for short-term bicycle parking. The location must conform to ISCOTT guidelines stating that a bicycle rack may be located only within the last five feet of a bus stop and at least five feet from a crosswalk.
Locations Within a Campus-Type Setting	Racks should be located near the entrance to each building. Where racks are clustered in a single location, they should be surrounded by a fence and watched by an attendant. The attendant can often share this duty with other duties to reduce or eliminate the cost of labor being applied to the bicycle parking duties; a cheaper alternative to an attendant may be to site the fenced bicycle compound in a highly visible location on the campus. For the long-term parking needs of employees and students, attendant parking and/or bicycle lockers are recommended.
Locations in Popular Retail Areas	In many popular retail areas, at least one and often two racks exist on each side of the block, an increase from the past practice of locating one rack per sidewalk segment. Areas officially designated or used as bicycle corridors may warrant the consideration of more racks. The current bicycle rack installation program is now adding to this number, either per requests from the public or by the observed need for more racks than are provided. In addition, the City's current bicycle rack installation program should be extended to the private off-street parking lots of existing businesses, including supermarkets, super drugstores, retail stores, shopping malls, and other locations.

INVERTED "U" RACKS

Inverted "U" racks are the current preferred type of Class II bicycle parking in San Francisco. The racks provide two contact points to support a bicycle, are simple to use and install, and require little maintenance. The cost to install each rack, including program staffing as well as the purchase, site survey, and installation of the racks, is approximately $175.



Inverted "U" Rack

RING RACKS

Ring racks (about $100 each, with varying installation costs) are an alternative type of Class II bicycle parking. Two basic designs are available: the "sleeve" ring rack, which is mounted as a sleeve on parking meters, and the "bolt-on" ring rack, which is bolted to an existing pole or other structure. Stand-alone racks are also available. Sleeve ring racks require only removal and reinstallation of a parking meter head, while bolt-on ring racks require drilling into an existing post. Stand-alone racks are more expensive to install, as they require anchoring in the sidewalk.

Use of "bolt-on" ring racks is not recommended in San Francisco due to security concerns. "Sleeve" ring racks specially manufactured from square tubing to minimize theft may be viable options for short-term bicycle parking San Francisco. These racks are most appropriately used in commercial areas where parking meters exist and space is too limited to install inverted "U" racks.

Sleeve ring rack

Bolt-on ring rack

"Sleeve" ring racks may be more aesthetically acceptable to merchants than the inverted "U" racks, since they do not substantially change the appearance of the sidewalk space. These racks can also be used where sidewalk material cannot accommodate an inverted "U" rack (thin, brittle, or non-standard material such as marble sidewalk material).

CURBSIDE STREET BICYCLE PARKING

Where racks cannot be installed on sidewalks (because of narrow sidewalk width, obstructions, etc.), bicycle parking can be installed in the street itself: clustered racks in a car parking space protected by bollards and racks installed on sidewalk bulb-outs.

Clustered racks in a car parking space protected by bollards (Berkeley, CA).

Racks on a sidewalk bulb-out (Boulder, CO).

If the street area to be used for bicycle parking is not all concrete, additional costs may be incurred to widen the concrete area so that the racks can be firmly anchored. Sidewalk bulb-outs can be expensive if substantial drainage and/or utility work is necessary. Sidewalk bulb installation alone can exceed $30,000, not including bicycle rack costs. However, bulb outs are sometimes installed as streetscape improvements or development activities and bicycle racks may be able to be added.

While on-street bicycle parking may take space away from the automobile parking, this may be mitigated by: creating additional auto parking spaces by consolidating driveways, moving fire hydrants, or adding parking on adjacent streets. Options for combining bicycle and motorcycle parking also exist. Designs for on-street or bulb out bicycle parking should consider drainage, emergency vehicle access to buildings, and maintenance of motorist, pedestrian, and bicyclists' sight lines.

ATTENDED BICYCLE PARKING

Attended parking is practical where there is a heavy demand for secure bicycle parking. College campuses and high schools are obvious locations, as are employment locations with a large commuter bicycling population. Bicycle attendant duties become more cost-effective when shared with other duties, such as garage attendant, security guard, or private bicycle maintenance and repair operator. Attendant parking should be particularly considered for locations with heavy demand for bicycle parking but no existing bicycle parking facilities, such as the many BART

Attended bicycle parking at the Giant's Ball Park, provided by the SFBC.

stations without bicycle lockers. Bicycle access to transit stations is discussed in detail in Chapter 4, "Transit and Bridge Access."

San Francisco, in accordance with Traffic Code Sec. 815, requires monitored bicycle parking at most large permitted events. Ordinance 323-98 (11/19/98) added Sec. 815, "Monitored Bicycle Parking at Public Events," to the Traffic Code and authorized ISCOTT to require and develop guidelines for monitored bicycle parking at large permitted events. The current ISCOTT guideline requires bicycle parking provisions in site plans as a permit condition for events with 2000 or more anticipated participants.

Sec. 815 allows event organizers to charge a fee for monitored bicycle parking service, but some organizations have provided free bicycle parking service. To encourage the use of valet parking, it should be made available at no cost or on a "donation" basis. Although DPT does not require event organizers to use a particular bicycle parking organization, it does provide the contact information for the San Francisco Bicycle Coalition (SFBC) because they have successfully provided free (donation-based) valet bicycle parking at many public events such as the Fort Mason Blues Festival; the Landscape Garden Show; and various street fairs for many years utilizing volunteers and inexpensive equipment (such as portable fences, portable racks, and cables).

EVENT PARKING FOR BICYCLES

To relieve the impact of traffic and parking congestion, event sponsors should also take an active role in promoting bicycling to the event by advertising the valet bicycle parking. Bicyclists should be encouraged to use the valet parking, thereby removing the obstructions to pedestrian flow created by bicycles locked to trees and posts.

BICYCLE PARKING OUTREACH

Action 3.14 Develop and maintain a DPT, City-distributed, bicycle-parking outreach campaign in print, audio-visual, and web-based formats to provide relevant bicycle-parking information such as garage locations and locker availability.

Action 3.15 Work with the San Francisco Police Department (SFPD) to make bicycle theft investigation a higher priority and to create a better system for returning recovered bicycles to their owners.

Public information is important to an effective citywide bicycle parking program. Many facilities are not visible to the public due to their location within garages and often are not obvious to employees in a specific building where bicycle parking is located. Additional outreach efforts to provide information about the location and accessibility of bicycle parking, will help to ensure that City investments are well used and will provide encouragement to potential bicycle commuters.

The City's Bicycle Program currently advertises the availability of bicycle parking in City-owned (and private) garages by:

- issuing signs depicting the availability of parking (to be posted on the outside of the garage where cyclists are likely see it);
- printing and distributing thousands of maps showing the location of bicycle parking; and
- posting information on the Bicycle Program website.

The DPT Bicycle Program should incorporate the following components into this bicycle parking information campaign:

- Conduct a publicity campaign informing cyclists and potential cyclists of the availability and location of bicycle parking;
- Provide a DPT fact sheet showing free and fee-based bicycle parking available at City-owned Parking Garage;
- Develop and publish a comprehensive high-quality brochure, including a map, showing bicycle parking locations in appropriate detail according to location;
- Modify its existing computer database of all publicly-accessible parking facilities in the City to calculate required bicycle parking in private garages in accordance with existing Planning Code Section 155.2; and
- Work with the Bicycle Advisory Committee (BAC) and the SFBC to create a Bicycle Theft Task Force. This task force would be charged with looking at ways to reduce bicycle theft within the City, and to encourage better bicycle parking facilities.

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4. TRANSIT AND BRIDGE ACCESS

TRANSIT AND BRIDGE ACCESS GOALS AND OBJECTIVES

Goal:

Expand Bicycle Access to Transit and Bridges

Objectives:

- Provide bicycle access to transit vehicles whenever feasible;
- Provide convenient bicycle access and bicycle parking at transit stations; and
- Provide bicycle access to all bridges whenever feasible.

RECOMMENDED TRANSIT AND BRIDGE ACCESS ACTIONS

City staff should prioritize the following policies and actions in order to implement the goals for improved bicycle access to transit services and bridges in San Francisco:

Action 4.1

Create a Muni policy that explicitly permits folded bicycles on all San Francisco Municipal Railway (Muni) vehicles.

Action 4.2

Develop a pilot program to provide bicycle access on light rail vehicles for a trial period.

Action 4.3

Update Muni bicycle accessibility guidelines and widely distribute and publicize these guidelines.

Action 4.4

Work with Bay Area Rapid Transit (BART) to analyze existing policy, identify expanded bicycle-access times, and create a trial program for non-folding bicycle access in both directions on Transbay peak period trains.

Action 4.5

Work with Caltrain, which is a major commuter connection to downtown San Francisco, to expand bicycle access on its fastest service "Baby Bullet" trains.

Action 4.6
Ensure that all San Francisco transit stations, including the new Transbay Terminal, provide barrier-free bicycle access and state-of-the-art bicycle parking facilities.

Action 4.7
Work with San Francisco Bay Area transit operators and the Metropolitan Transportation Commission (MTC) to develop, implement, maintain, expand, and enforce improved inter-modal bicycle access.

Action 4.8
Promote bicycle parking "stations" at transit hubs that provide secure, monitored bicycle parking, commuter information, and bicycle maintenance services.

Action 4.9
Allow cyclists with disabled bicycles (due to mechanical failure or collision) to bring them on Muni vehicles, interior space permitting and at the vehicle operator's discretion, when the Muni vehicle either does not have bicycle racks or have racks that are full.

Action 4.10
Install bicycle racks on all Muni-operated buses, and all other transit buses operating in San Francisco, including the 45-foot Golden Gate Transit (GGT) equipment.

Action 4.11
Work with the California Department of Transportation (Caltrans) and the Golden Gate Bridge, Highway and Transportation District (GGBHTD) to provide improved bicycle access to and upon all San Francisco bridges, including the design and building of a multi-use path on the west span of the Bay Bridge.

Action 4.12
Work with Caltrans and the MTC in continued studies of the Bay Bridge pathway to ensure that such a facility integrates with San Francisco's on-street bicycle facilities in a manner that is safe and convenient for bicycle commuter and recreational cyclists.

INTRODUCTION

The integration of bicycle and transit use on a local and regional basis enhances the role of each in providing convenient transportation. It is essential in maximizing the bicycle's transportation utility for medium-range trips, whether for commute, recreational, or utilitarian purposes. Bicycle access should be provided to all transit modes, including bus, streetcar, rail, and ferry. Bicycles access should also be provided on San Francisco's bridges whenever feasible to ensure maximum connectivity.

Access to transit vehicles, like bicycle parking at transit stations, provides an inter-modal link that improves the efficiency and range of both transit and bicycling. Access to transit vehicles themselves provides maximum mobility at both ends of the transit trip. However, transit vehicles are often too crowded to accommodate many bicycles. The policies below are intended to

maximize the opportunity for transit users to bring bicycles on board while recognizing that secure bicycle parking at transit stations will facilitate many bicycle-and-transit inter-modal trips. The policy recommendations for San Francisco Muni may be enacted by the San Francisco Municipal Transportation Agency (MTA). San Francisco does not have jurisdiction over the other transit agencies listed. These recommendations constitute an official request to those agencies to consider these suggestions for improving the bicycle utility of their systems.

Good bicycle access to transit has two major components:

- Well promoted parking at transit stops, including:
  - secure facilities;
  - enough spaces to meet the demand; and
  - available at an affordable cost; and

- Bicycle transport on transit vehicles, including:
  - access at all reasonable hours;
  - enough spaces to meet the demand; and
  - no additional charge beyond the standard passenger fare.

TRANSIT AND BRIDGE ACCESS ACTION FRAMEWORK

It is important to provide bicyclists with ease and efficiency of access to all of the major public transit modes serving San Francisco including rail, light rail, bus, and ferry. This access must be provided to both the transit vehicles themselves and at transit stops and stations.

MUNI BICYCLE ACCESS

Action 4.1 Create a San Francisco Muni policy that explicitly permits folded bicycles on all buses and LRVs.

Action 4.2 Develop a pilot program to provide bicycle access on light rail vehicles for a trial period.

Action 4.3 Update Muni bicycle accessibility guidelines and widely distribute and publicize these guidelines.

Muni is the seventh-largest public transit system in the United States, providing local transit service by bus, light rail ("Metro"), historic streetcars, and cable cars. Currently, none of Muni's rail vehicles permit bicycles on board and bicycle racks are not feasible from an engineering and safety standpoint. However, Muni's light rail vehicles could provide an important service for bicyclists by permitting bicycles on board.

Almost every light rail system in North America allows bicycles on-board (including the Santa Clara Valley Transportation Authority, Sacramento Regional Transit District, and the Los Angeles County Transportation Commission).

A Muni pilot program to permit bicycles on light rail vehicles would provide a test of the safety and operational impacts of allowing bicycles on board. Specific design measures should be developed to ensure that bicycle access does not interfere with other passengers' convenience or safety, particularly for the elderly and small children. Muni should implement such a pilot program , beginning on the Third Street light rail line, as proposed as a mitigation measure in the 1998 Third Street Light Rail Project Environmental Impact Report[1]. Although Muni and the Department of Parking and Traffic (DPT) still need to determine light rail vehicle program regulations, they should consider the following:

Photo credit: Valley Transportation Authority

Bicycle commuter enters a VTA LRV during commute hour.

- Bicycles (except folding bikes) should not be allowed on crowded vehicles;
- Off-peak hours commute hours should first be explored in a trial allowing bicycles on LRVs;
- Bicyclists with proof of payment should board at one of the back doors and remain near that back door while on-board; and
- Bicyclists needing to purchase a ticket should pay at the front door and remain near the front door while on-board, unless the operator instructs them otherwise.

It is important that Muni and DPT develop criteria that can be used to evaluate the success of this trial program. This pilot program should conclude with recommendations for continuation or modification to the service and accompanying regulations.

In addition to LRV access, Muni bicycle guidelines should also provide clear guidance to transit operators and bicyclists regarding the front loading bicycle racks on buses; and the allowance of folding bicycles within Muni vehicles. Directions and promotional material on how to use the front loaded racks should be developed as part of these guidelines. Clear policy direction should also be included be regarding the allowance of folded bicycles on all buses and LRVs.

[1] Since the DEIS/DEIR finds on page 5-2 that the project "precludes the future development of a formalized (striped) bike lane...," The Third Street Rail Project Preliminary DEIS/DEIR recommends on page 3-68 "that Muni establish a policy providing for the accommodation of bicycles on the Third Street light rail vehicles."

BAY AREA RAPID TRANSIT ACCESS

Action 4.4 Work with BART to analyze existing policy, identify expanded bicycle-access times, and create a trial program for non-folding bicycle access in both directions on Transbay peak period trains.

BART provides heavy rail service for the Bay Area and San Francisco, including eight stations within San Francisco. East Bay counties are connected to San Francisco via BART's Transbay Tube and service south of the City has recently been extended to the San Francisco International Airport, with a new Caltrain transfer station in Millbrae. Since bicycles are currently prohibited from using the Bay Bridge, BART is a critical Transbay link.

Photo credit: BikeMap.com

Commuter bicycles on the Caltrain Cab Car.

Bicycle access has improved from no access when BART first opened to the current access rules[2] created through BART's Bicycle Accessibility Task Force (BBATF). Cyclists can now board more trains and are allowed in all cars except the first. Although BART allows bicycles at "off-peak" hours, it prohibits bicycle access on "commute" trains in the "commute direction." This is a strong disincentive for Transbay bicycle-commuters. Existing bicycle access restrictions limit BART as a commute option for many cyclists, thereby impeding the advantages of inter-modal bicycle commuting. .

CALTRAIN ACCESS

Action 4.5 Work with Caltrain, which is a major commuter connection to downtown San Francisco, to expand bicycle access on its fastest service "Baby Bullet" trains.

Caltrain provides commuter rail service to downtown San Francisco's Fourth & Townsend Streets Station from 34 stations to the south, including Millbrae, Hillsdale, Palo Alto, San Jose and Gilroy. Bikes are allowed on every train in the "bike car," designated with a yellow bicycle sticker. Each "bike car" can accommodate up to 32 bikes. All trains have one "bike car" and some have two. Cyclists must board and exit trains after other passengers. Detachable or collapsible trailers or large, bulky attachments that expand bicycle width, such as saddlebags, backpacks or briefcases, are not permitted. Cyclists must be at least 12 years old. Since the "baby bullet" began its operation, the bicycle capacity on each train has been reduced. Bicycle capacity should be increased along this regional rail line.

[2]A full description of the BART Bicycle Rules can be found at the BART website: http://www.bart.gov/guide/bikes/bikeOverview.asp

TRANSIT STATION ACCESS

Action 4.6 Ensure that all San Francisco transit stations, including the new Transbay Terminal, provide barrier-free bicycle access and state-of-the-art bicycle parking facilities.

The new Transbay Terminal will serve as the City's major transit hub, linking bus and light rail lines, as well as Caltrain commuter rail service and potentially high-speed intercity rail service. The new multi-modal station, which will be built on and around the current location, has received final environmental clearance, and moved closer to being built. Additionally, the surrounding redevelopment plan calls for thousands of housing units, offices, and retail space: basically, a new San Francisco neighborhood. Large numbers of automobiles move through this employment center and transportation hub every day. In such a compact downtown neighborhood bicycle facilities can provide an important source of congestion relief.

Photo credit: Transportation Alternatives Magazine

Secure bicycle parking at Penn Station (station serves 500,000 rail passengers per day).

In all new and existing transit facilities, the City should be involved in the planning and design processes to ensure that convenient bicycle access by way of elevators, ramps, or escalators is provided to all building levels, particularly those with train platforms. Adequate bicycle parking in and around the stations should also be provided.

MULTI-MODAL TRANSIT STATIONS

Action 4.7 Work with San Francisco Bay Area transit operators and the MTC to develop, implement, maintain, expand, and enforce improved inter-modal bicycle access.

The existing Transbay Terminal serves approximately 20,000 bus passengers per day and the newly renovated Caltrain 4th & King Streets Station serves approximately 12,200 rail passengers daily. The planned extension of Caltrain to the new Terminal will likely bring a sharp increase in the demand for bicycle facilities in and around the station, such as access to all platforms, bicycle parking solutions, and routes to and from the station.

The existing Transbay Terminal will be replaced by an inter-modal facility serving Caltrain, AC Transit, Golden Gate Transit, SamTrans, Greyhound, Amtrak bus service, and Muni bus and light rail lines. It will have an underground connection to BART. The new Transbay Terminal will bring all modes of transportation to downtown San Francisco—immediately accessible to the City's active core—and address the Bay Area's most pressing need for greater inter-connectivity of transit service. By the year 2020 the Transbay Terminal will potentially serve

10,000 bus passengers and 12,000 train passengers during peak hours, with capacity for considerably more. A total of 50 bus bays will meet the 2020 growth forecast for all operators currently using the Transbay Terminal and it will have sufficient latent capacity to meet further service expansion. It is critical that the overall design for this new facility address bicycle access, circulation, and storage in order to promote multi-modal commute trips.

For projects under the jurisdiction of the San Francisco Redevelopment Agency (SFRA) and joint powers agencies such as the Transbay Joint Powers Authority (Transbay Terminal), these agencies should consult with the DPT bicycle program to ensure adequate bicycle facilities and bicycle access are provided on all street and/or building designs.

BART BICYCLE STATION ACCESS AND PARKING

Bicycle access to underground BART stations is restricted to stairs and elevators that were not originally designed to accommodate bicyclists. Access fare gates are also designed for pedestrians only, requiring that bicyclists use the emergency/wheel chair gate for their bicycles and then return to the pedestrian entrance. This station infrastructure can be improved through future station renovations. Recently constructed BART stations provide a wide fare gate that can accommodate wheelchairs and bicycles.

The following is a list of BART Stations in San Francisco. It is recommended that DPT support and assist BART in its plan to improve station access, specifically including, the installation of parking improvements and bicycle stair channels.

Table 4-1
BART's Recommended Access and Parking Improvements[3]

Station Location	Recommended Facility Improvement	BART's Priority
16th Street	Parking Improvement	High
16th Street	Stair Channel Priority	Immediate
24th Street	Parking Improvement	High
24th Street	Stair Channel Priority	Medium
Balboa Park*	Parking Improvement	Medium
Balboa Park*	Stair Channel Priority	Medium
Civic Center*	Parking Improvement	High
Civic Center*	Stair Channel	High
Embarcadero*	Parking Improvement	Low
Embarcadero*	Stair Channel	Immediate
Glen Park*	Parking Improvement	Medium
Glen Park*	Stair Channel	Medium
Montgomery*	Parking Improvement	High
Montgomery*	Stair Channel	Medium
Powell*	Parking Improvement	High
Powell*	Stair Channel	High

* Denotes a Shared Muni and BART station

[3] BART Bicycle Access and Parking Plan; Volume 1.

MUNI BICYCLE STATION ACCESS AND PARKING

Several Muni Metro Stations are shared with BART (see Table 4-1). These shared stations are within BART's jurisdiction. The City should assist BART in their efforts to improve access at shared stations. DPT should also request that the MTA adopt designs similar to those being employed in BART stations to improve bicycle access and bicycle parking at Muni Metro Stations. Issues of pedestrian clearance and rider safety should be addressed. As access to Muni light rail vehicles is instituted, signage, stair channels and adequate bicycle parking should be installed at the Castro Street, West Portal, Forest Hill, and Church Street Stations.

Right-of-way (ROW) bicycle rack installation at non-underground Muni Metro Stations should be actively encouraged by Muni, and implemented by the DPT Bicycle Program. DPT's Bicycle Program has installed bicycle racks near Muni Metro and BART Stations, but DPT does not install racks within the stations.

CALTRAIN

Fourth and Townsend Streets Station

See the discussion below under the Bike Stations heading.

Twenty-Second Street Station

Bicycle access improvement is strongly recommended at this station. The current stair access is inadequate to encourage more bicyclists to use this station.

Bicycle Parking is limited at this station. Previously, commuter bicycle lockers were installed at Muni's Woods Maintenance Yard, adjacent to the station. These lockers served bicycle commuters accessing the 22nd Street Station. However these lockers were removed due to security concerns after September 11, 2001. It is recommended that Muni and Caltrain improve and reinstall the commuter bicycle parking for this station once security issues have been addressed.

BIKE STATIONS

Action 4.8 Promote bicycle parking "stations" at transit hubs that provide secure, monitored bicycle parking, commuter information, and bicycle maintenance services.

Bike stations are a wonderful way to promote inter-modal transportation. Bike Stations allow commuters, shoppers, and tourists to bicycle to a transit hub, switch to the transit system, and also receive affordable, secure bicycle parking or repair services. San Francisco is developing two Bike Stations: Embarcadero BART and Caltrain at Fourth and Townsend. At the urging of the DPT Bicycle Program and the San Francisco Bicycle Coalition (SFBC), Caltrain secured funding for and is currently designing a "BikeStation" at the Fourth and Townsend Streets Station. This facility is within Caltrain's jurisdiction, but is being supported by several agencies and organizations including the Department of the Environment (SF Environment), the SFBC, and DPT Bicycle Program.

BUS-BICYCLE ACCESS

Buses provide a critical trip link for many bicyclists traveling longer commute distances, shopping where larger purchases limit safety or ability to complete a round trip, or when weather conditions limit the desirability and comfort of a bicycle trip.

Front-mounted bicycle rack on the 38 Geary.

Unless noted otherwise, all bus transit providers serving San Francisco:

- Use front-mounted bicycle racks that hold two bicycles;
- Allow only single-rider, two-wheel bicycles; and
- Require cyclists to be able to load and unload their bikes without help from the operator.

MUNI BUS ACCESS

Action 4.9 Allow cyclists with disabled bicycles (due to mechanical failure or collision) to bring them on Muni vehicles, interior space permitting and at the vehicle operator's discretion, when the Muni vehicle either does not have bicycle racks or have racks that are full.

Action 4.10 Install bicycle racks on all Muni-operated buses, and all other transit buses operating in San Francisco, including the 45-foot GGT equipment.

Nearly all of Muni's fleet, about 900 buses, carries up to two bicycles on a front-mounted bicycle rack. No operational difficulties associated with this rack type have been identified and Muni should continue to provide bicycle racks on all of its buses and ensure existing racks are maintained.

Regional Bus Transit Access

The San Francisco Bay Area is served by many transit operators. SamTrans, AC Transit, and GGT each accommodate bicycles on their buses, as described below. Since multi-modal bicycle commuters and recreational riders depend on one or more of these transit operators, City staff should work with the MTC and regional transit operators to improve the capacity and convenience of inter-modal bicycle access to San Francisco.

SamTrans Bus Access

SamTrans, operated by the San Mateo County Transit District, provides bus service throughout San Mateo County and into parts of San Francisco and Palo Alto. The entire SamTrans fleet of buses is equipped with front-mounted bicycle racks. Two additional bikes are allowed inside

buses, depending on passenger loads. SamTrans has no age limitation for riders bringing bikes onto buses.

AC Transit Bus Access

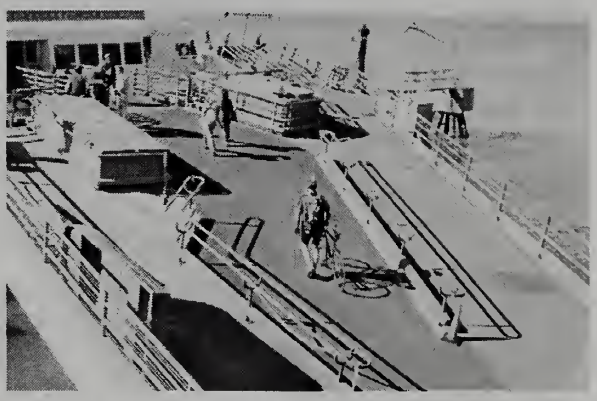
AC Transit, operated by The Alameda-Contra Costa Transit District, serves 13 cities and adjacent unincorporated areas in Alameda and Contra Costa Counties. AC Transit operates local East Bay bus service and 26 commuter bus routes from the East Bay to the Transbay Terminal in downtown San Francisco. The entire AC Transit fleet of Transbay buses can accommodate at least two bicycles on each bus. In addition to the exterior racks, the 45-foot buses that AC Transit operates over the San Mateo Bridge carry four additional bicycles in folding racks located inside the cargo bays.

Golden Gate Transit Bus Access

GGT provides regional bus service in San Francisco, Marin and Sonoma Counties, as well as limited local service within Marin County. Although GGT buses up to 40 feet long have bicycle racks, they should outfit their 45-foot vehicles as now permitted by state law and already implemented by AC Transit (see above). GGT schedules buses without racks to routes with more frequent service so that cyclists can easily wait for a bus that does have a rack.

Ferry Bicycle Access

Two ferry operators provide service to San Francisco: Golden Gate Ferries and Blue & Gold Ferries. Both services allow bicycles free of charge. Golden Gate Ferries operate from San Francisco to Larkspur and Sausalito and provides 25 bicycle spaces (15 on catamarans) on a first-come, first-serve basis. Blue & Gold Ferries operate from San Francisco to Sausalito, Tiburon, Alameda/Oakland, Vallejo and Angel Island and allow up to 20 bicycles per boat at the discretion of the captain. No policy change is recommended at this time.



Bicyclist accessing the Blue & Gold Ferry.

Bridge Bicycle Access

Action 4.11 Work with Caltrans and the GGBHTD to provide improved bicycle access to and upon all San Francisco bridges, including the design and building of a multi-use path on the west span of the Bay Bridge.

San Francisco is served by two major regional bridges: the Golden Gate Bridge to the north and the San Francisco-Oakland Bay Bridge to the east. Several local bridges within San Francisco also exist. Whenever new local bridges are constructed, bicycle travel should be accommodated.

Golden Gate Bridge

The Golden Gate Bridge is operated by the GGBHTD. Cycling distance across the bridge is 1.7 miles including the bridge approaches. Cyclists approach the bridge from San Francisco through the Presidio by way of Lincoln Boulevard, and from Marin County by way of Alexander Avenue from downtown Sausalito or through Fort Baker. Raised sidewalks provide direct two-way bicycle access on both sides of the bridge, although cyclists may only use one side of the bridge per the schedule presented in Table 4-2.:

Table 4-2

Bicycle Access on the Golden Gate Bridge

Day	October – May Pacific Standard Time	June – September Daylight Saving Time	Weekdays	Weekends/ Holidays
Morning	6:00am to 3:30pm	5:00am to 3:30pm	East Sidewalk	West Sidewalk
Evening	3:30pm to 6:00pm	3:30pm to 9:00pm	West Sidewalk	West Sidewalk
Night	6:00pm to 6:00am	9:00pm to 5:00am	East Sidewalk	East Sidewalk

Since 1992, cyclists have been allowed night access to the bridge via a monitored security gate. When a cyclist pushes a call button, a toll officer responds. The officer verifies that the call is from a cyclist via a camera and video monitor and remotely opens the gate. After 15 seconds, the gate automatically closes. The security gate access program was financed through San Francisco's Transportation Development Act Article 3 funds, and was a cooperative venture involving the GGBHTD, the San Francisco Bicycle Advisory Committee (SFBAC), the SFBC, and the DPT Bicycle Program.

The GGBHTD added a railing to improve bicyclist and pedestrian safety in 2003. The rail consists of seven horizontal cables, spaced 6 inches apart, connected to steel posts every 12-1/2 feet. The top rail is 4 feet-6 inches high. At the 4-foot mark, it curves toward the walkway and culminates in a handrail.

Additional recommended improvements for bicyclists should include design improvements to the south approach to the west sidewalk. The current 90 degree turn and narrow transition from the bridge sidewalk to the paved path is difficult for bicyclists to navigate, as is the paved pathway itself as it descends under the bridge. Alternative designs and routes should be analyzed in an engineering feasibility study to determine if safety and convenience improvements can be made. Direct, straight-line access to the west sidewalk should be considered.

San Francisco-Oakland Bay Bridge

There are no sidewalks on the 7-mile long Bay Bridge and bicycles are not allowed. However, bicycles are accommodated in this corridor at various times on BART, the Caltrans Bicycle Commuter Shuttle, and AC Transit. The shuttle is a 12-passenger van that tows a specially built trailer with 12 bicycle racks. It operates nonstop between the Transbay Terminal in San Francisco and the MacArthur BART Station in Oakland only during peak commute periods on a 45-minute headway. The fare is $1.00 each way. This shuttle is funded as part of the Bay Bridge

operational budget. The new Transbay Terminal must provide a conveniently located shuttle stop (both convenient to bicyclists and to bridge access).

Bicycle Path on the Bay Bridge

Action 4.12 Work with Caltrans and the MTC in continued studies of the Bay Bridge pathway to ensure that such a facility integrates with San Francisco's on-street bicycle facilities in a manner that is safe and convenient for bicycle commuter and recreational cyclists.

The main span of the new East Span of the Bay Bridge will be a single-tower self-anchored suspension design. In 1998, MTC (acting as the Bay Area Toll Authority, or BATA) approved $50 million to incorporate a bicycle/pedestrian path on the new bridge. The 15.5-foot-wide path will run along the southern edge of the eastbound deck, from Yerba Buena Island to Oakland and will be positioned one foot above the motor vehicle deck so as to shield users from traffic noise and exhaust.

Image credit: NewBayBridge.com, 2004

Photo rendering of the proposed Bay Bridge bicycle and pedestrian pathway (view heading toward Oakland).

Two primary alternatives were studied for the bicycle/pedestrian path: providing a single path cantilevered off the south side of the span, or separating bicyclists and pedestrians by building two pathways, one on either side of the span. Decision-makers also looked at placing the path above or below the motor vehicle deck.

Ultimately, the Engineering and Design Advisory Panel, the Bay Bridge Design Task Force, and the MTC/BATA Commission adopted a one-path option because (a) the path on the north side of the westbound span heading uphill from Oakland to Yerba Buena Island could have interfered with motorists' views, and (b) for security sake, it would be better to concentrate what may be, on many days, a modest number of path users on one facility, instead of spreading them over two.

In 2000, Caltrans launched a $3 million study (funded by MTC/BATA) to look at the technical feasibility and cost of extending the path to the west span. Completed in 2001, the study found that a west span path could technically be constructed; however, the American Association of Cost Engineers estimated the cost of such a path to be $160.4 million.[4]

[4] Source: I-80 SFOBB West Span Pathway Study: Feasibility Report (CH2M HILL) April 26, 2004. http://www.mtc.ca.gov/projects/bay_bridge/bbbike.htm

5. EDUCATION

EDUCATION GOALS AND OBJECTIVES

Goal:

Educate the general public and targeted population about bicycle safety.

Objectives:

- Create, fund, and implement official Department of Parking and Traffic (DPT) bicycle-safety curricula for the general public and targeted populations.
- Create, fund, and implement DPT bicycle-safety outreach campaigns for motorists, bicyclists, and the general public.

RECOMMENDED EDUCATION ACTIONS

City staff should place a high priority on the following actions in order to implement the goal of educating the public about bicycle-safety:

Action 5.1
Provide DPT bicycle-safety information to diverse age, income, and ethnic populations.

Action 5.2
Provide DPT bicycle-safety information in languages that are widely used within San Francisco such as Spanish and Cantonese.

Action 5.3
Partner with other agencies, where appropriate, to distribute DPT bicycle-safety education materials in mass mailings.

Action 5.4
Create a web-based bicycle education traffic school curriculum as an option in lieu of other pecuniary penalties for traffic law violators.

Action 5.5
Increase DPT participation in Bike to Work Day activities by providing resources and materials as staff availability and funding allow.

Action 5.6
Implement new outreach campaigns for improved bicycle facilities, especially those located on the Bicycle Route Network.

Action 5.7
Develop DPT bicycle-safety classes for City employees.

Action 5.8
Develop a DPT bicycle-safety workshop for transit operators and other fleet-vehicle operators.

Action 5.9
Develop bicycle-safety curricula for use in the San Francisco Unified School District (SFUSD) and San Francisco public colleges.

Action 5.10
Periodically evaluate and adjust, where appropriate, DPT's bicycle-safety program.

INTRODUCTION

Bicycle-safety education can be divided into two major categories: those that develop safety awareness by providing information to the public through outreach channels such as media campaigns, brochures, and websites; and those that teach specific bicycle handling and traffic maneuvering skills through classroom instruction combined with practical on-bike training.

Motorists and bicyclists have rights and responsibilities for safe roadway sharing. However, motorists endanger bicyclists' safety when they do not view bicyclists as legitimate road users. Furthermore, both motorists and bicyclists endanger themselves and others by violating certain traffic laws. Ambiguities in the California Vehicle Code (CVC) or road users' education, when combined with unaccommodating roadway designs, can exacerbate confusion and conflicts between automobiles and bicycle traffic.[1]

Although completion of the bicycle facility upgrades recommended in Chapter 2 of this plan (Bicycle Route Network), and revision to traffic codes, when necessary, can improve safety, bicycle-safety education for motorists and bicyclists that teaches proper roadway behavior is an essential ingredient for improving bicyclists' safety in San Francisco.

The following sections present information on bicycle-safety education in San Francisco for the general public and targeted populations. While similar safety themes are relevant for all audiences, each group requires a tailored approach. This chapter recommends actions that are intended to create a new official City bicycle-safety education program that draws upon existing national best practices, improvements to existing, but limited bicycle educational materials, and adaptation of bicycle safety specifically to San Francisco's unique bicycling environment.

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1 For example, CVC references to a bicyclist using a crosswalk when crossing a roadway from a multi-use path are vague.

Motorist education is vague for motorists. Many do not realize that a motorist shall make right hand turns from a bicycle lane (CVC 21717)

EDUCATING THE GENERAL PUBLIC

Action 5.1 Provide DPT bicycle-safety information to diverse age, income, and ethnic populations.

The purpose of general bicycle-safety classes or media campaigns is to educate the general public about the rights and responsibilities of bicyclists and motorists and to improve the overall perception of bicycle transportation. This plan discusses previous and existing bicycle-safety campaigns in San Francisco and makes recommendations for improvement.

The DPT bicycle-safety program needs to initially focus upon curricular development. The League of American Bicyclists (LAB) curriculum provides a valuable base for the creation of basic bicycle safety program. It should be locally adapted to address San Francisco's unique cycling environment and to targeted populations such as existing urban cyclists, potential cyclists, motorists, children, commuters, and City employees.

The following general actions provide a framework for improving the City's mass media educational outreach campaigns presenting bicycle-related information. The City has made much progress over the past several years in promoting awareness of bicycle safety issues and encouraging bicycle use. Events such as "Bike to Work Day," materials such as the *Safe Bicycling in San Francisco*[2] booklet, and media campaigns, such as the Coexist Campaign, are examples of this progress. Bicycle Program staff should explore additional opportunities for creative and effective dissemination of bicycle-safety education.

The City should continue to expand upon existing educational media campaigns, including: printed brochures, maps, stickers, posters, radio and television ads, events, mailings, online information, billboards, and ads posted on public transit vehicles, bus stops, and stations. Each of these tactics can encourage bicycling, while building a fundamental awareness of bicycle safety.

BICYCLE SAFETY OUTREACH

Action 5.2 Provide DPT bicycle-safety information in languages that are widely used within San Francisco such as Spanish and Cantonese.

Action 5.3 Partner with other agencies, where appropriate, to distribute DPT bicycle-safety education materials in mass mailings.

Coexist Campaign

As a result of the City's compact geography and multi-modal transportation options, bicyclists must often share the road with automobiles. In response to growing concerns over how to encourage motorists and bicyclists to operate in a legal and safe manner, the Coexist Campaign was developed jointly by the DPT and the San Francisco Bicycle Coalition (SFBC). Important concepts used in developing this campaign included:

2 Safe Bicycling in San Francisco can be downloaded from the DPT website at www.bicycle.sfgov.org

- creation of a positive image for both cyclists and of motorists;
- encouragement of respect among road users; and
- promotion of safe bicycling behavior.

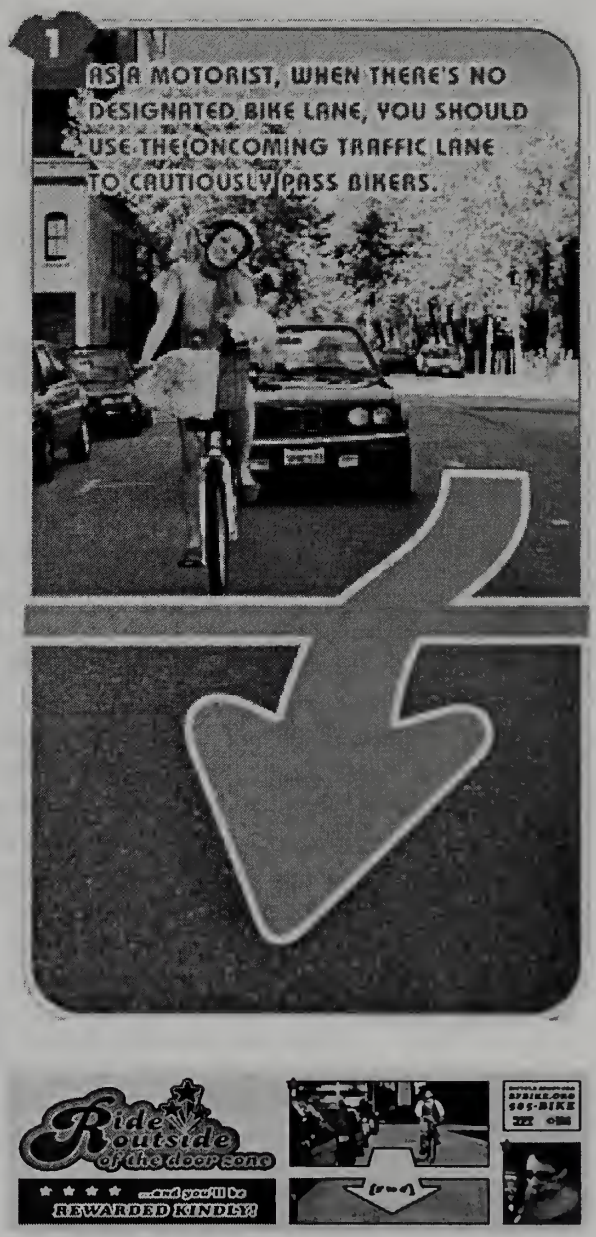
In addition to placing posters (with the message of encouraging motorists and cyclists to share roadway space safely) on Muni buses and at transit shelters throughout the City, the Coexist Campaign also installed permanent Bicycles Allowed Full Use of Lane (BAFUL)/Change Lanes To Pass signs[2] alerting motorists and bicyclists that CVC Section 21202 permits bicycles to use the full lane. On certain streets, the "door zone" extends so far into a lane that cyclists must position the bicycle fully in the lane to operate safely. Although more education on this essential cycling skill is needed, the BAFUL signs are a good start.

Printed Materials

Safe Bicycling in San Francisco is a 34-page handbook that covers a wide range of topics for beginner, intermediate, and advanced cyclists. The handbook can be downloaded from the Bicycle Program website, or obtained for free from DPT. The handbook includes chapters addressing bicycle fit and equipment, proper helmet use, simple maintenance checks, secure bicycle-parking tips, basic skills for riding in traffic, more advanced techniques for lane positioning and intersection movements, and tips for using transit, riding at night, riding in inclement weather, and road users' rights and responsibilities. San Francisco residents can also be reached via direct mail. Bicycle safety and promotion materials could be included with residential parking permits or other mass mailings distributed by the City. An annual mailing of a simple brochure or pamphlet on safe bicycle practices could be included in existing mailings from a variety of agencies and companies.

Electronic Materials

The DPT Bicycle Program website is an affordable, flexible way to reach most San Francisco residents, commuters, and tourists from around the world.


AS A MOTORIST, WHEN THERE'S NO DESIGNATED BIKE LANE, YOU SHOULD USE THE ONCOMING TRAFFIC LANE TO CAUTIOUSLY PASS BIKERS.
Ride outside of the door zone
...and you'll be REWARDED KINDLY!

2003 campaign advertisements encouraging motorists to obey the law and exercise caution when passing bicyclists.

2 To view BAUFL Report : http://www.bicycle.sfgov.org/site/uploadedfiles/dpt/bike/Article_BAUFL_Sign.pdf

The Bicycle Program Home Page, http://www.bicycle.sfgov.org, provides educational materials and informational resources such as San Francisco's official Bicycle Routes Network map with street gradients and contours, relevant reports and studies, and links to other useful websites.

Web-Based Education

Action 5.4 Create a web-based bicycle education traffic school curriculum as an option in lieu of other pecuniary penalties for traffic law violators

DPT should create a web-based bicycle education traffic school option for traffic violators. Since motorists already have a strong incentive to participate in some type of traffic-school to mitigate issues surrounding their driver's license record and insurance costs, they are more likely to sign up. This is an excellent outreach opportunity because it pairs motorists who are already experiencing the consequences of their roadway behavior with exposure to how traffic maneuvers impact bicyclists. The program would also be valuable for bicyclists cited for moving violations. The curriculum should cover relevant traffic laws, share-the-road concepts, and traffic maneuvering skills.

EVENTS

Action 5.5 Increase DPT participation in Bike to Work Day activities by providing resources and materials as staff availability and funding allow.

Events such as "Bike to Work Day" are an effective way to promote bicycle transportation and encourage driver (and media) awareness of bicycle commuting. In previous years SF Environment, the SFBC, and the Metropolitan Planning Commission (MTC) have taken a very active role in organizing "Bike to Work Day." This Plan recommends that DPT increase its participation level in this event. Similar events could include bicycle-safety presentations made by volunteers to give interested community members basic bicycle safety tips as well as maintenance and riding techniques. These organized events also present opportunities to distribute safety products such as bicycle lights, helmets, reflective leg bands, stickers, real-view mirror decals, and bumper stickers, as funding allows.

San Francisco Mayor Gavin Newsom with SFBC staff, DPT staff and others during the 2004 Bike to Work Day.

REGIONAL INFORMATION PROGRAMS

Partnerships with regional agencies such as RIDES and the Metropolitan Transportation Commission are the most efficient and effective way for City staff to undertake large-scale regional education programs. Recent regional information distribution efforts including the 511-telephone hotline, for example, could target bicyclists from other cities that frequent San Francisco. San Francisco routinely attracts many visiting motorists

to its employment centers, culinary delights, and cultural offerings. It is important, therefore, for the City to educate motorists regionally to increase the chance that visitors will properly share the roadway with cyclists.

The DPT Bicycle Program should become actively involved in the Bay Area regional LAB education program such as San Jose and Palo Alto have. The SFBC have begun teaching a four hour in-door class, which the City should actively support and enhance. The City's official bicycle-safety classes should draw upon LAB's ten hour BikeEd concepts and national best practices adapted to the particular challenges, such as steep hills, found in San Francisco. DPT Bicycle Program should take an active role in bicycle education for the City and County of San Francisco, and assist in the Bay Area education efforts, including the SFBC's. Currently, regional education classes are listed on the RIDES 511 website.[3]

BICYCLE FACILITIES EDUCATION

Action 5.6 Implement new outreach campaigns for improved bicycle facilities, especially those located on the Bicycle Route Network.

Electronic and printed educational materials using text and graphics, as appropriate, can educate people about the City's official Bicycle Route Network, secure bicycle parking (addressed in Chapter 3), bicycle shops and rental locations, traffic laws, and safe bicycling techniques. The City should explore innovative techniques: such as using private business funds to distribute bicycle-safety materials in exchange for advertising; and celebrity involvement to generate wider appeal. In addition to general bicycle transportation awareness, outreach campaigns should also educated the public about the proper meaning and use of specific bicycle-facilities.

This strategy is particularly important with newly introduced traffic control devices, such as the proposed "Shared Use Pavement Arrow," which will require a sustained educational campaign to meaningfully teach the intended behavior signaled by this new traffic device. The San Francisco Shared Lane Marking Study (Appendix B) explains the need for such an educational outreach campaign in greater detail. In summary, the study found that although the marking had an effect on motorists' and bicyclists' behavior and lane placement, the intended message of the marking was poorly understood by a significant percentage of survey respondents. Recommended themes for campaigns and public service announcements include:

- Encourage motorists to respect bicyclists' legal right to use the road;
- Encourage drivers to open car doors with caution to avoid "dooring" collisions with cyclists; and
- Encourage safe cycling and driving practices including discouraging double-parking in bike lanes.

3 http://www.rides.org/main/index.htm

TARGETED BICYCLE EDUCATION

CITY EMPLOYEES

Action 5.7 Develop DPT bicycle-safety class for City Employees.

Since City employees routinely use vehicles in San Francisco, they should be formally trained in how to safely share the roadway with bicycles. DPT Bicycle Program staff should develop educational materials to teach employees of all City departments safe bicycling techniques. There were approximately 28,000 positions in the City and County of San Francisco in fiscal year 2001-02.[4] A concerted bicycle education effort for all City departments could also encourage an increase in the bicycle commute mode share for San Francisco, as well as educate City employees about the proper sharing of the road with different modes of travel.

TRANSIT OPERATORS

Action 5.8 Develop a DPT bicycle-safety workshop for transit operators and other fleet-vehicle operators.

Since many Muni vehicle share the roadway with bicyclists, DPT Bicycle Program staff should work with Muni and other transit agencies to develop a comprehensive training program for transit vehicle operators which promotes bicycle-safety awareness and effective road sharing techniques. Such a program should also be targeted toward shuttle and taxi drivers. Additionally, effective road sharing techniques should be included in all bicycle-safety curricula for cyclists.

BICYCLE EDUCATION FOR CHILDREN, YOUTH, AND ADULTS

Action 5.9 Develop bicycle-safety curricula for use in the San Francisco Unified School District (SFUSD) and San Francisco public colleges.

CHILDREN AND YOUTH

Bicycling and walking are the only independent transportation modes available to children. Bicycling allows children to explore their neighborhood, get exercise, and gain a valuable skill that is useful for a lifetime. Before the age of nine, most children do not have the maturity and developmental skills required to ride a bicycle in urban traffic situations. These skills include the development of wider peripheral vision and the ability to judge the spatial movement of objects: especially the speed and direction of automobiles. Parents of children under nine, therefore, should supervise their child's bicycle use by first learning the essential bicycle safety concepts themselves such as proper fit and type of bicycle equipment and basic mechanical skills needed to start, balance, steer, and stop a bicycle.

4 May 3, 2004. http://www.ci.sf.ca.us/wcm_controller/community_indicators/government/govtworkers/govtworkers.htm

For elementary school children over eight years old, bicycle-safety education should include both the students and their parents. Although educational materials, including donated helmets and bicycle accessories might be distributed to school-aged children, it should be remembered that, whenever possible, both parents and children should learn action-oriented handling skills. Studies have shown that "videos, flyers, posters, coloring books, and assemblies are effective at introducing traffic safety rules, but unfortunately they have little bearing on children's behavior. Bicycling safely requires physical skills that can best be learned through repetitive practice..."[5]

San Francisco bicycle education in progress.

Qualified City staff should work with the SFUSD to develop bicycle safety curricula for all SFUSD classrooms. The League of American Bicyclists, the Federal Highway Administration's Bicycle Safety Education Resource Center, and best practices from other cities should all be considered when developing these classes.

In addition to technical skill and traffic laws, bicycle-safety education for children should promote bicycling as an enjoyable transportation method with positive lifestyle, health, and environmental benefits. Programs and practices that will make bicycling to school easier and safer, such as the Safe Routes to Schools Program, should also be promoted.

The recommended curricula to teach children bicycle safety should include:

- Recognition and avoidance of the most common bicycle collisions;
- Motorists' and bicyclists' rights, responsibilities, and roadway sharing behaviors;
- Proper bicycle helmet adjustment and fit[6];
- Bicycle purchase, maintenance, and repair;
- Physical, social, and economic consequences of a bicycle collisions;
- Environmental, economic, and health benefits of bicycling;
- Proper bicycle locking techniques;
- Proper lane placement for typical bicycle maneuvers;

5 DiBrito, Roger and Sharon et al. Left, Right & Left Again, Volume I. 1994. Ride Safe, Inc., Warrenville, IL.

6 Although helmets are not a legal CA requirement for adults, they have been shown to reduce or prevent head injuries in bicycle collisions. Many adults, however, do not wear helmets while riding a bicycle, and those that do often wear them incorrectly, greatly diminishing their potential to protect them in the event of a collision.

- Bicycle handling skills; and
- Other riding in traffic skills.

Some of the children-targeted bicycle education events conducted in the City have included: SAFE Annual Bicycle Safety Fair, Stop for Kids Safety, Walk n' Wheels Bike Fair, Trips for Kids, and the Earn-a-Bike program. The City also maintains a Safe Moves Trailer which contains mock traffic signals, plywood automobile and house cut-outs, and other props that enable DPT staff to build simulated roadway conditions to teach bicycle safety at neighborhood schools and community events throughout San Francisco. City staff should evaluate these and other bicycle education programs for children and prioritize funding for those that are deemed the most effective in teaching bicycle handling skills.

ADULTS

Most of teenage and adult bicyclists have not had formal bicycle education outside of learning the basic bio-mechanics required to ride a bicycle. Additionally, misconceptions, myths, and outdated advice can further erode adult bicyclists' safety. (For instance, some believe that one should ride a bicycle facing traffic rather than with the flow of traffic.)

San Francisco has the highest percentage of bicycle commuters of any U.S. city with a population of over 500,000 people. These riders are often familiar with the basics of safe cycling, but they have limited formal training in the proper techniques of bicycling in traffic. The compact nature of the City's streets and San Francisco's status as an employment center underscore the importance of teaching adults effective urban cycling skills. The DPT, therefore, should create a strategic plan for teaching bicycle safety to the City's diverse adult population. . DTP should also create a plan for offering the City's official bicycle educations curriculum at local college and university campuses.

Possible topics to be addressed in adult bicycling education classes include:

- Helmet fitting demonstrations
- Helmet fitting tips
- Visibility techniques: see and be seen
- Bicycle maintenance and repair
- Safe stopping
- "door zone" awareness
- Traffic maneuvers: lane positioning and safe turns
- Riding predictably while scanning for conflicts and traffic
- Relevant traffic laws

- Advanced bicycle commuting skills: inter-modal transit; and load distribution to maximize bicycle transportation utility
- Bicycle "Fix-It" tickets (If implemented by the City)

PROGRAM EVALUATION

Action 5.10 Periodically evaluate and adjust, where appropriate, DPT's bicycle-safety program.

Periodic program evaluation of outreach, advertising, and class offerings, is needed to improve quality, where needed, and help the bicycle-safety program achieve its intended effect. This should be an iterative process that monitors the efficacy of classes, workshops, and educational materials and allows changes to program elements where appropriate. Shifts in popular culture or demographics can have an impact on the program. Program evaluations can reveal opportunities and challenges for specific safety messages as well as identify new populations for targeted outreach. At each periodic review, DPT should try to identify subpopulations that have not been historically targeted, consider them for specific campaigns, and try to determine the effectiveness of such an approach.

6. ENFORCEMENT AND SAFETY

ENFORCEMENT AND SAFETY GOALS AND OBJECTIVES

Goal:
Improve bicycle safety through targeted enforcement of moving violations.

Objectives:

- Increase San Francisco Police Department (SFPD) enforcement of motorist and cyclist traffic violations that pose the greatest threat to safety;
- Provide Department of Parking and Traffic (DPT) bicycle safety education to police and that focuses on safe cycling, relevant traffic laws, and safe sharing of the roadway; and
- Increase SFPD enforcement of motorist violations in bicycle facilities, including additional patrols of bike lanes to address double parking.

RECOMMENDED ENFORCEMENT ACTIONS

City staff should place a high priority on the following policies and actions to realize the goal of improved bicycle safety through increased enforcement of moving violations in San Francisco:

Action 6.1
Place a high priority on SFPD enforcement of both bicyclist and motorist violations that most frequently injure cyclists.

Action 6.2
Develop a SFPD "fix-it ticket" program, in collaboration with the DPT, for bicycle equipment violations.

Action 6.3
Develop a method at the SFPD to systematically share non-collision bicyclist citations with DPT Bicycle Program.

Action 6.4
Develop and implement, in collaboration with the SFPD, a DPT bicycle-safety traffic school curriculum as an option for those cited for moving violations.

Action 6.5
Request that the California Bicycle Coalition work to change California Vehicle Code (CVC) 21754 (Passing on the right) so that it applies to bicycles.

Action 6.6
Clarify sections of the San Francisco Traffic Code that pertain to double parking in bicycle lanes and increase parking enforcement and fines for this violation.

Action 6.7
Post "no parking in bike lane" signs along bicycle lanes where double parking occurs.

Action 6.8
Increase the enforcement of motorcycles operating in bike lanes.

Action 6.9
Develop a DPT bicycle-safety curriculum for all SFPD police officers that focuses the rights and responsibilities of bicycle traffic and techniques required for safe and legal sharing of the roadway.

Action 6.10
Increase SFPD and DPT bicycle-mounted patrols.

Action 6.11
Develop a system for hospitals, emergency rooms, and clinics to report all instances of bicycle injury to the SFPD and to the DPT Bicycle Program Manager.

Action 6.12
Implement a system to allow cyclists to report collisions directly to the Bicycle Program website.

Action 6.13
Inform cyclists that they are legally entitled to file a collision report, if one is not initiated by the police.

Action 6.14
Develop a standardized procedure for reporting San Francisco Municipal Railway (Muni) bicycle-related incidents and make this information more transparently available to the Bicycle Program.

INTRODUCTION

This chapter presents recommendations for increased law enforcement as well as bicycle safety education to improve bicycling safety in San Francisco. When combined with well-planned facilities and educational programs, enforcement can be an effective means of enhancing safety for all road users. The good news about cycling safety in San Francisco is that the reported bicycle collisions have steadily declined from 412 in 1998 to 285 in 2002 (Chart 6-A)[1]. At the same time, the number of bicycle commuters in the City nearly doubled between 1990 and 2000.[2]

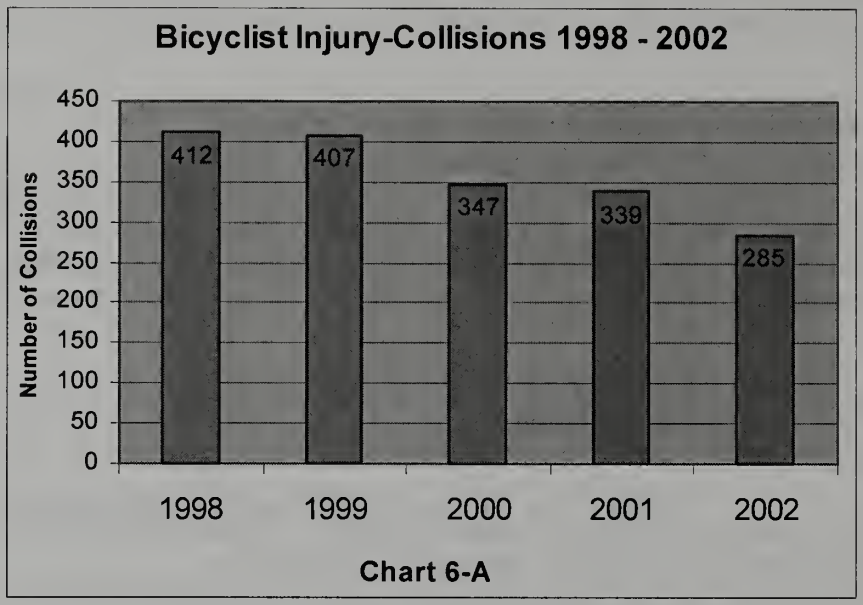


Chart 6-A

Although there is empirical and anecdotal evidence that bicycle collisions are underreported[3], those that do get reported provide a strong indication of roadway behaviors that negatively impact cyclists' safety. Careful review of these bicycle collisions can help identify which violations should be prioritized for increased enforcement, assist with the planning of new bicycle facilities, and provide safety education opportunities. The discussion of recommended policies below is based on data from reported traffic collisions covering January 1, 1998 to June 30, 2003. All recommendations are based on analysis of this data and the knowledge that some collisions go unreported. (Actions 6.11 through 6.13 address unreported collisions).

1 Does not include an average of eight reported non-injury, property-damage only bicycle collisions per year over the period analyzed.

2 U.S. Census 1990 and 2000 data (see this Plan's Introduction)

3 While the Statewide Integrated Traffic Records System (SWITRS) details 412 bicycle-related collisions for San Francisco in 1998, the Profile of Injury in San Francisco, published by the Department of Public Health (DPH) Injury Center (www.tf.org) shows that the San Francisco Fire Department (SFFD) Emergency Medical Services (EMS) Division responded to 441 incidents in which bicyclists were injured in 1998. Anecdotal evidence comes from collisions or near-misses that resulted in very minor or no injury, but were still caused by some of the same unsafe roadway behaviors outlined in this chapter.

ANALYSIS OF MOTORIST AND BICYCLIST MOVING VIOLATIONS

From January 1, 1998 to June 30, 2003, motorists were cited as the party at fault in a majority (56 percent) of the nearly 2,000 reported bicycle collisions. Bicyclists also shared responsibility in some of the high-frequency collision categories. Regardless of the primary cause of an automobile/bicycle collision, bicyclists are far more likely to be injured than motor vehicle operators. For example, bicyclists are injured in almost all reported collisions analyzed.

Improving San Francisco bicycle safety is the primary goal of this Plan's proposed bicycle education and enforcement strategies. Education and enforcement, therefore, need to focus on violations that most frequently cause personal injury. Based upon the latest understanding of bicyclists' and motorists' behaviors and collision data, this Plan recommends the creation of a DPT Bicycle Education Program that builds upon existing outreach efforts (Chapter 5) and renewed enforcement of a few high-frequency violations by both bicyclists and motorists.

Any increased enforcement effort, however, should also include bicycle safety training for all police officers to enhance their understanding of the proper operation of a bicycle in traffic and to ensure more equitable assessments at collision scenes[4]. Education should include crucial bicycle traffic knowledge such as: bicyclists passing stopped buses; double-parked vehicles; right-turning vehicles on the left; lane positioning techniques for bicyclists to establish their proper and legal right in a travel lane; stopping at red lights; and the necessity of avoiding the "door zone" (the area next to parked cars into which a car door can be abruptly opened). Bicyclists should also be educated regarding the conflicts of these and other cycling maneuvers. In issuing citations, police officers must be able to distinguish between a bicyclist legitimately passing on the right of slow cars, whether in a striped bicycle lane or a shared travel lane, and a bicyclist passing on the right when passing on the left is recommended. The City should continually work to understand which motorist and bicyclist violations are the most common sources of collisions and tailor enforcement efforts to discourage these behaviors. The City should also explore education and facility improvements that encourage motorists and bicyclists to share the road.

MOTORIST MOVING VIOLATIONS

Analysis of recent collision data indicates that a few common motorist behaviors contribute to the majority of automobile-bicycle collisions. The five most common reported behaviors of motorists that result in collisions with bicycles in the past five-plus years are shown in Table 6-1.

"Dooring" is the most frequent motorist violation. The second and third most common motorist violations involve: failure to yield to bicyclists who, by law, had the right-of-way. The fourth and fifth most frequent violations are unsafe traffic maneuvers that lead to collisions with bicyclists. As outlined in (Table 6-3) below, motorists were responsible for 62 percent of the ten most common collision categories and a majority (56 percent) of all bicycle-related collisions (Table 6-4) for the past five years, yet bicyclists suffered all of the injuries and fatalities. Approximately 0.5 percent of reported motorist-caused bicycle collisions involved drugs or alcohol (Table 6-4). Driving under the influence, therefore, was not a significant factor for the motorist-caused collisions. It should also be noted that motorist, while assigned fault, were not often cited for their violations.

4 The SFPD has improved their reporting of bicycle collision significantly over past years. In 1997, for instance, only 35 bicycle collisions (a statistically implausible number) were registered in the SWITERS database.

Table 6-1

Bicycle/Automobile Collisions in San Francisco Where Motorist Were Most Frequently Assigned Fault [1998-2003][5]

Ranking	Description	CVC Section	Number of Collisions[6]	% of Total Collisions	Number Where Fault Not Assigned	# of Motorists Assigned Fault	% of Motorists Assigned Fault[7]	# of Bicyclists Assigned Fault	% of Bicyclists Assigned Fault
1	Opening Car Door when Unsafe	22517	194	10	3	191	100	0	0
2	Failure to Yield when Turning Left	21801.a	165	8	3	131	81	31	19
3	Yield to Approaching Traffic	21804.a	127	7	0	99	78	28	22
4	Unsafe Turn and/or without Signaling	22107	121	6	3	100	85	18	15
5	Unsafe Pass on Left	21750	66	3	0	51	77	15	23
TOTALS			**673**	**35**	**9**	**572**	**84[8]**	**92**	**14[9]**

The Right-Of-Way (ROW) violations, numbers 2, 3, and 4 in Table 6-1, could indicate that motorists are either not "seeing" cyclists lawfully operating as traffic or simply disregarding cyclists' rights to share the road. The fifth most frequent violation, Unsafe Pass on Left, is a more blatant violation because in this case, the motorist is overtaking a bicyclist who often is clearly visible. Although it is encouraging that the SFPD is assigning fault to the motorists in these cases, they have not often cited the motorist for the violations. To re-enforce proper roadway behavior, it is recommended that violators be issued a citation.

5 This table uses SWITERS data from 01/01/1998 to 06/01/2003.

6 The collisions highlighted above represent, by far, the most frequent primary collision causes where motorists were assigned responsibility for a large majority of the incidents. These collisions resulted in some seriously injured cyclists and one cyclist fatality.

7 These percentages were calculated after the number of collisions for which no fault was assigned has been subtracted.

8 This represents the percentage of collisions from these five categories only (Table 6-1).

9 This represents the percentage of collisions from these five categories only (Table 6-1).

BICYCLIST MOVING VIOLATIONS

Bicyclists were assigned fault a large majority of the time for some violations: failure to stop at the limit line for red lights, failure to stop at the limit line for STOP signs, and wrong side of roadway (Table 6-2). While motorists were assigned fault more than 77 percent of the time in five of their most common violation categories, bicyclists were assigned fault for about 66 percent of the time in four of their most common collision categories. Motorists and bicyclists were assigned fault about the same percentage of the time for Unsafe Speed (Table 6-2).

Since Red light running is the most frequent primary collision factor for which bicyclists were assigned fault, it is the one bicyclists behavior being recommended for targeted enforcement. The size (and geometry) of some San Francisco intersections combined with relatively low cycling speeds, however, sometimes contributes to bicyclists not being able to "clear" an intersection before the signal changes to red. In this situation, the cyclist has a right to clear the intersection with oncoming traffic legally required to wait. Police should not ticket bicyclists for red light running in this scenario.

Curtailing red light running is important: the City should combine enforcement with roadway improvements and bicycle traffic education to achieve improved safety for cyclists. For example, roadway upgrades, such as bicycle boxes at intersections and "sharrows" for narrow lanes, are potential solutions for proper cyclist lane positioning (see Appendix A: Supplemental Design Guidelines for more information on these treatments). Bicycle safety education for both cyclists and police officers should include lessons on how to distinguish between a bicyclist legitimately passing slow cars, whether in a striped bicycle lane or not, and that of a bicycle passing on the right when he/she should pass on the left. These latter situations include: passing a stopped bus, passing a double-parked vehicle, and passing a right-turning vehicle.

Table 6-2
Bicycle/Automobile Collisions in San Francisco Where Bicyclists Were Most Frequently Assigned Fault [1998-2003][10]

Ranking	Description	CVC Section	Number of Collisions[11]	% of 5-Year Total	No Fault Assigned[12]	# of Motorists Assigned Fault	% of Motorists Assigned Fault[13]	# of Bicyclists Assigned Fault	% of Bicyclists Assigned Fault
1	Failure to Stop at limit line on Red	21453.a	181	9	5	63	36	118	67
2	Unsafe Speed[14]	22350	174	9	1	81	47	92	53
3	Wrong Side of Roadway	21650	129	7	4	9	7	116	92
4	Failure to Stop at STOP sign Limit Line	22450	108	6	3	29	28	76	72
5	Passing on Right when Unsafe	22755	52	3	1	3	6	48	94
TOTALS			**644**	**33**	**9**	**185**	**29[15]**	**450**	**70[16]**

10 This table uses SWITERS data from 01/01/1998 to 06/01/2003.

11 The collisions highlighted above represent, by far, the most frequent primary collision causes where motorists were assigned responsibility for a large majority of the incidents. These collisions resulted in some seriously injured cyclists and one cyclist fatality.

12 The number of collision reports that did not assign fault to either party.

13 These percentages were calculated after the number of collisions for which no fault was assigned has been subtracted.

14 Both bicyclists and motorists were assigned similar percentages of fault for this violation.

15 This represents the total percentage of collisions from these five categories only (Table 6-2).

16 This represents the total percentage of collisions from these five categories only (Table 6-2).

Table 6-3
Summary: Most Frequent Bicycle-Related Collisions
(Based on 1950 total collisions [1998-2003][17])

# Motorists responsible for Ten Most Frequent Collisions	792
# Bicyclists Responsible for Ten Most Frequent Collisions	494
Ten Most Frequent Collisions Total	1286
% Motorists Responsible for Ten Most Frequent Collisions	62%
% Bicyclists Responsible in Ten Most Frequent Collisions	38%
Top Ten Collisions as % of All Collisions ['98-'03]	66%

ENFORCEMENT AND SAFETY ACTION FRAMEWORK

MOVING VIOLATIONS

Action 6.1 Place a high priority on SFPD enforcement of both bicyclist and motorist violations that most frequently injure cyclists.

Action 6.2 Develop a SFPD "fix-it ticket" program, in collaboration with the DPT, for bicycle equipment violations.

Action 6.3 Develop a method at the SFPD to systematically share non-collision bicyclist citations with DPT Bicycle Program.

Action 6.4 Develop and implement, in collaboration with the SFPD, a DPT bicycle-safety traffic school curriculum as an option for those cited for moving violations.

An active campaign to involve the SFPD in enforcement of traffic safety laws directly affecting bicyclists should be carried out by the DPT Bicycle Program. A task force with the SFPD and DPT should be set up to develop a priority of enforcement infractions for both motorists and bicyclists. Priority for issuing citations should be given to the motorist violations identified above that most frequently cause collisions with bicyclists.

When cited for riding without lights and/or reflectors, cyclists should have the option to avoid a fine if they present evidence of properly equipping their bicycle within a reasonable time period. Such a "fix-it ticket" policy already exists for motor vehicles not equipped with the proper safety equipment and those not operating properly. This policy could also address the enforcement of

17 This table uses SWITERS data from 01/01/1998 to 06/01/2003.

other bicycle safety violations, such as properly operating bicycles and helmets on child bicyclists.

Citations issued for moving violations are bicycle-safety education opportunities. While proactive measures are best, classes to correct errant roadway behavior should be developed by DPT and offered as traffic school using best practices from other California communities with similar programs already in place. San Francisco's curriculum should focus primarily on cycling in traffic skills, share the road concepts, and rights and responsibilities of both bicyclist and the motorist. As an alternative to a fine for a bicycle-related violation, offenders should be given the option of enrolling in a traffic school program with an emphasis on bicycle issues. Such a program could also be an option for non-bicycle related traffic infractions.

BICYCLES PASSING ON THE RIGHT

Action 6.5 Request that the California Bicycle Coalition work to change California Vehicle Code (CVC) 21754 (Passing on the right) so that it applies to bicycles.

The 1997 Plan recommends that the City ask the state legislature to correct an apparent oversight in CVC 21754 which allows passing on the right under certain circumstances:

> The driver of a motor vehicle may overtake and pass to the right of another vehicle only under the following conditions: (a) When the vehicle overtaken is making or about to make a left turn. (b) Upon a highway within a business or residence district with unobstructed pavement of sufficient width for two or more lines of moving vehicles in the direction of travel. (c) Upon any highway outside of a business or residence district with unobstructed pavement of sufficient width and clearly marked for two or more lines of moving traffic in the direction of travel. (d) Upon a one-way street. (e) Upon a highway divided into two roadways where traffic is restricted to one direction upon each of such roadways.

The provisions of this section shall not relieve the driver of a slow moving vehicle from the duty to drive as closely as practicable to the right hand edge of the roadway.

Since CVC 21754 allows motor vehicle to pass on the right of left-turning vehicles, when there is room for at least two lines of moving traffic in the direction of travel, or on a one-way street or on divided highway, it seems entirely within the spirit of the Vehicle Code for a bicyclist to overtake a motorist on the right within a lane wide enough to accommodate a line of moving bicycles. This would clearly be the case where there is a bicycle lane or shoulder; in other places, it depends on the width and condition of the lane and on traffic speed and volume.

There is a difficulty, however, with the letter of the law: CVC 21754 refers only to *motor* vehicles, not to vehicles in general, and is therefore not made applicable to bicycles by '21200. This seems to be an oversight on the Legislature's part, since if construed literally, '21754 would require bicyclists to pass even left-turning motorists on the left. Note that Action 6.5 does **not** recommend unrestricted passing on the right by bicyclists.

Since this is a statewide issue, it would be more properly initiated by the California Bicycle Coalition.

BLOCKING OF BICYCLE LANES

Action 6.6 Clarify sections of the San Francisco Traffic Code that pertain to double parking in bicycle lanes and increase parking enforcement and fines for this violation.

Action 6.7 Post "no parking in bike lane" signs along bicycle lanes where double parking occurs

Action 6.8 Increase the enforcement of motorcycles operating in bike lanes.

While enforcement of double parking in bicycle lanes has improved since 1997, automobiles are still blocking the free movement of cyclists.

As a result of the 1997 Plan, a DPT Parking Control Officer (PCO) has been assigned to bicycle lane duty during the morning peak period. DPT has also actively identified and re-designated some curb zones in areas where double parking in bicycle lanes was a problem (such as Valencia and Market Streets). This measure mitigated some of the double parking by providing more short-term parking through colored curb short-term parking zones. This measure should be expanded. A thorough analysis of the PCO enforcement beat structure, double parking violation locations, and land use data should be undertaken by the DPT to improve its enforcement and to create additional mitigation measures (as specified above) for double parking. As staff resources permit, a team of PCOs should be assigned to patrol bike lanes to cite double parked vehicles at all times of day, with a particular focus on morning and evening peak periods.

The San Francisco Traffic Code (T.C.) should be amended accordingly and fines for double parking in bicycle lanes should be reevaluated. Note that while **TC SEC. 38.N. PARKING IN BICYCLE LANES PROHIBITED; FINES** states that "no person shall block any portion of a marked bicycle lane with his or her vehicle on weekdays from the hours of 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. Any person violating this Section shall be subject to a fine of $100," a motorist who double parks in a bike lane at other times can still be cited for general double parking.

CITY DEPARTMENT OUTREACH ON BICYCLE ENFORCEMENT ISSUES

A variety of City departments have influence over the proper enforcement, acceptance and management of bicycling. In order for these departments to more effectively and judiciously manage bicyclists' behavior and collect bicycle-related traffic and collision data, additional action is required by the City.

SAN FRANCISCO POLICE DEPARTMENT

Action 6.9 Develop a DPT bicycle-safety curriculum for all SFPD police officers that focus the rights and responsibilities of bicycle traffic and techniques required for safe and legal sharing of the roadway.

Action 6.10 Increase SFPD and DPT bicycle-mounted patrols.

The SFPD has made progress in addressing bicycle issues in the City[18]. Building upon this success, the DPT should provide bicycle traffic education to police officers focusing on the rights and responsibilities of cyclists and the practice of proper bicycle positioning techniques in traffic. The curriculum and materials for this education effort should draw from relevant sources such as the League of American Cyclists, the CVC, and the T.C.

Bicycle traffic education should be integrated into trainings for all SFPD police officers. In addition to developing awareness of the challenges of maneuvering a bicycle in traffic, a bicycle-safety training course should provide a list of guidelines to assist with bicycle-related collision reports: this helps ensure valuable documentation of information for public health studies regarding injury prevention. The bicycle safety education training should be administered by a certified instructor as opposed to simply showing officers educational videos. Support from the Chief of Police is essential and a meeting between the Chief of Police, the DPT Executive Director, and bicycle-mounted police is recommended as a first step.

Consistent with the City's Transit First Policy, the beat structure for the DPT Enforcement Division should be restructured to better serve transit, pedestrians, and bicyclists. Individual beats should incorporate transit and bicycle corridors rather than using such corridors as divisions between beats. For example, it would be preferable to include both sides of a section of Market Street in one beat, rather than use this section of Market Street as the boundary of two beats. With Market Street being the boundary, each direction of the street falls into a separate beat.

Since they have to review cases involving conflicts and collisions between motorists and bicyclists, the District Attorney's Office staff should be included in bicycle-safety training. Such training could be integrated with the police trainings or with workshops offered at other City departments as proposed in Chapter 5.

Bicycle-mounted police officers are more sensitive to bicyclists' rights and bicycle safety issues due to their increased understanding of the physical characteristics of bicycles, the relationship of bicyclists to motorists in a traffic situation, and the challenges of bicycle operation in an urban environment. As police departments have learned throughout the country, bicycle patrols are very effective in dealing with crimes that take place where police cars cannot go, or where they cannot go without being noticed.

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18 In 1997 there was an under-reporting of bicycle-related collisions. Although hundreds of collisions were reported over the past five years based upon yearly SWITERS data, the SFPD reported only 35 collisions in 1997.

While patrol car beats and patrol car back-ups will always be required, the SFPD should evaluate the potential of expanding bicycle patrols into more neighborhoods as well as into park and downtown settings.

The City should encourage contributions from police officers to neighborhood and bicycling publications to present their perspectives on bicycling issues to motorists and cyclists alike.

DEPARTMENT OF PUBLIC HEALTH AND EMERGENCY SERVICES AGENCIES

Action 6.11 Develop a system for hospitals, emergency rooms, and clinics to report all instances of bicycle injury to the SFPD and to the DPT Bicycle Program Manager.

Action 6.12 Implement a system to allow cyclists to report collisions directly to the Bicycle Program website.

Action 6.13 Inform cyclists that they are legally entitled to file a collision report, if one is not initiated by the police.

The collision data presented in this chapter, while useful in identifying the most crucial roadway behaviors that lead to bicyclist injuries, does not include the many unreported bicycle collisions believed to occur in San Francisco. To better understand the current state of cycling conditions and best improve bicyclists' safety, this Plan recommends the injury/collisions reporting actions 6.11 through 6.13. The information gathered from these actions will help improve our understanding of patterns and causes of injuries and assist Bicycle Program injury prevention and education efforts.

For the last several years, the San Francisco Department of Public Health has been working on an injury data linkage project using hospital admission data. Currently, San Francisco General Hospital (SFGH) is not obligated to report bicycle injuries to the SFPD. This is left up to the injured parties. EMS (ambulance services) is supposed to report bicycle injuries, but many are not reported. Comparing police collision reports with SFGH emergency room visits or hospital admissions shows that approximately 20 percent of pedestrian injuries (caused by a collision with a motor vehicle) did not show up in police collision reports in 2000 and 2001. The rate for bicycle injuries is probably similarly under-reported[19].

The City should work to educate law enforcement officers and bicyclists about bicyclists' legal right to file a police report about collisions or threatening behavior by motorists. It is not mandatory to report a bicycle/automobile collision to the police. It is only mandatory if an assault is suspected. In addition, there is an issue of breach of confidentiality if collision data is

19 While the SWITRS details 412 bicycle-related collisions for San Francisco in 1998, the Profile of Injury in San Francisco, published by the Department of Public Health Injury Center (www.tf.org) shows that the San Francisco Fire Department EMS Division responded to 441 incidents in which bicyclists were injured in 1998. Anecdotal evidence comes from collisions or near-misses that resulted in very minor or no injury, but were still caused by some of the same unsafe roadway behaviors outlined in this chapter.

reported without the patient's consent. Therefore, improved injury reporting and coordination between departments is necessary. Collecting this data is also important because communities seeking funding for education or enforcement activities for bicycle safety have to use EMS, emergency room, or hospital discharge data to show seriousness and number of bicycle and/or pedestrian crashes in addition to "reportable" ones.

MUNI INCIDENTS REPORTS

Action 6.14 Develop a standardized procedure for reporting bicycle-related San Francisco Municipal Railway (Muni) incidents and make this information more transparently available to the Bicycle Program.

To maintain a relevant bicycle-safety and education program, it is important to have the most accurate data available on bicycling conditions. Since police reports do not have a standardized method for reporting transit/bicycle collisions, finding data for these incidents is time consuming and impedes DPT's bicycle safety efforts. The police place transit/bicycle collision data in ambiguous categories such as 'Other' and 'Other Bus' which could just as likely be a private bus, an airport shuttle, a taxi, or a trailer. For example, when DPT queried several different category combinations from 3/31/1998 to 6/01/2003 in search of transit/bicycle collisions, individual police reports had to be pulled and reviewed to determine how many collisions (approximately 50% of those analyzed or 33 collisions) involved Muni and one additional collision involved Golden Gate Transit. This data, especially when combined with other sources, helps DPT staff with facilities upgrades and bicycle-safety education. SFPD and transit agencies, therefore, should make standardized collision and incidents data more transparently available to DPT staff.

Muni currently tracks collisions (and other incidents) in a separate, internal database, the TransitSafe Incident database. This database tracks all incidents that cause delay to Muni vehicles. All Muni/bicycle collisions could be queried and tracked within this database, if the appropriate query attributes were added. In its current format, this database is not very useful in analyzing conflicts between bicyclists and Muni vehicles. If this database were to be improved, it would be an invaluable resource for analyzing and thereby improving bicycle safety in San Francisco. This database would be able to track police reported collisions, and bicycle/Muni conflicts that currently go unreported. Every effort within the MTA should be made to improve Muni's TransitSafe Incident reporting to make it a more a useful tool for improving bicyclist safety. Improvements to this reporting database would also benefit other road users, including pedestrians and motorists.

Table 6-4
Summary: Frequency Distribution of all Reported Bicycle-Related Collisions
(Based on 1950 total collisions [1998-2003][20])

Description	CVC Section	Number of Collisions[21]	No Fault Assigned[22]	# of Motorists Assigned Fault	% of Motorists Assigned Fault[23]	# of Bicyclists Assigned Fault	% of Bicyclists Assigned Fault
Opening Car Door when Unsafe	22517	194	3	191	100	0	0
Stop at limit line on Red	21453.a	181	5	63	36	118	67
Unsafe Speed[24]	22350	174	1	81	47	92	53
Failure to Yield when Turning Left	21801.a	165	3	131	81	31	19
Wrong Side of Roadway	21650 21650.1	129	4	9	7	116	93
Yield to Approaching Traffic	21804.a	127	0	99	78	28	22
Unsafe Turn and/or without Signaling	22107	121	3	100	85	18	15
Failure to Stop at STOP sign Limit Line	22450	108	3	29	28	76	72
Various Descriptions Given[25]	Not Cited	88	11	38	50	39	51
Unsafe Pass on Left	21750	66	0	51	77	15	23
Unsafe Lane Change	21658.a	63	0	34	54	29	46

20 SWITERS data from 01/01/1998 to 06/01/2003

21 The collisions highlighted above represent, by far, the most frequent primary collision causes where motorists were assigned responsibility for a large majority of the incidents. These collisions resulted in some seriously injured cyclists and one cyclist fatality.

22 The number of collision reports where fault was indicated.

23 These percentages were calculated after the number of collisions for which no fault was assigned has been subtracted.

24 While motorists were assigned fault a similar percentage of the time for Unsafe Speed, they did not experience the frequency of injury experienced by bicyclists in these collisions.

25 Since so many collisions do not have a CVC violation cited, it is difficult to analyze these collisions in a meaningful way. It indicates a need to improve police reportage at bicycle collision scenes.

Table 6-4
Summary: Frequency Distribution of all Reported Bicycle-Related Collisions
(Based on 1950 total collisions [1998-2003][20])

Description	CVC Section	Number of Collisions[21]	No Fault Assigned[22]	# of Motorists Assigned Fault	% of Motorists Assigned Fault[23]	# of Bicyclists Assigned Fault	% of Bicyclists Assigned Fault
Passing on Right When Unsafe	22755	52	1	3	6	48	94
Starting or Backing when Unsafe	22106	51	0	43	84	8	16
Failure to yield when entering highway	21802.a	41	1	29	73	11	28
Failure to Yield to Pedestrian in Crosswalk	21950.a	38	2	12	33	15	42
Following Too Closely	21703	26	0	12	46	14	54
Failure to yield ROW at Intersection	21800	26	0	14	54	12	46
Driving Under the Influence	23152.a	26	0	9	35	17	65
Designated Traffic Direction	21657	25	1	11	46	13	54
Bicycle Operation on Roadway	21202	23	3	10	50	7	35
Proceed at green light but yield to pedestrians/vehicles lawfully in intersection	21451.a	23	0	11	48	10	43
Driving on Sidewalk	21663	18	0	0	0	18	100
Improper Position for a Right-Turn at Intersection	22100.a	17	0	15	88	2	12
Pedestrian ROW in	21950.b	15	0	9	60	5	33

Table 6-4
Summary: Frequency Distribution of all Reported Bicycle-Related Collisions
(Based on 1950 total collisions [1998-2003][20])

Description	CVC Section	Number of Collisions[21]	No Fault Assigned[22]	# of Motorists Assigned Fault	% of Motorists Assigned Fault[23]	# of Bicyclists Assigned Fault	% of Bicyclists Assigned Fault
Crosswalk							
Laws Applicable to Bicycle Use	21200.a	13	0	6[26]	46	6	46
Improper Position for a Left-Turn at Intersection	22100.b	13	0	2	15	11	85
Passing on Right	21754	12	1	6	55	5	46
Failure to Yield ROW at Left or U-Turn	21801	12	1	5	46	5	46
Stop at Limit Line of Circular Red Light	21453.b	12	0	4	33	8	67
Failure to Obey Traffic Signal for Turn at Intersection	22101	11	0	5	46	6	55
Illegal U-Turn in Business District	22102	11	0	5	46	6	55
Failure to obey Traffic Signal	21461	10	0	2	20	7	70
Pedestrian Signal Violation	21456	9	0	5	56	4	44
Crossing Double	21460	9	0	6	67	3	33

26 Primary CVC collision factors and fault assignments can be confusing in some collision reports. In this category, for example, it appears that drivers were sometimes assigned fault, but the primary collision factor cites a CVC violation that only applies to bicycles. The same reports from this category also appear to cite an Under the Influence code for bicyclists even though the Has Not Been Drinking (HNBD) box was checked. It is understood that some collisions scenes will be ambiguous and chaotic, but this Plan recommends that DPT and SFPD work together to improve reporting the procedure at bicycle collision sites.

Table 6-4
Summary: Frequency Distribution of all Reported Bicycle-Related Collisions
(Based on 1950 total collisions [1998-2003][20])

Description	CVC Section	Number of Collisions[21]	No Fault Assigned[22]	# of Motorists Assigned Fault	% of Motorists Assigned Fault[23]	# of Bicyclists Assigned Fault	% of Bicyclists Assigned Fault
Yellow Line							
Motor Vehicle Turning Unsafely Into Bicycle Lane	21717	8	0	3	38	5	63
Circular Green or Green Arrow	21451	5	0	1	20	4	80
Bicycle Equipment Requirements	21201	3	0	2	67	1	33
Permitted Movements from Bicycle Lanes	21208	3	0	1	33	2	67
Failure to yield at flashing light	21457	3	0	1	33	2	67
Failure to Yield ROW upon entering Road	21804	3	2	1	100	0	0
Motorized Vehicle Illegally Operated in Bike Lane	21209	2	0	2	100	0	0
Illegal Operation on Divided Highway	21651	2	0	1	50	1	50
Improper Lane and Unsafe Speed	21655	2	0	1	50	1	50
Unsafe Passing on Left/obstructed view	21752	2	0	1	50	1	50
Illegal U-Turn in Residence	22103	2	0	2	100	0	0

Table 6-4
Summary: Frequency Distribution of all Reported Bicycle-Related Collisions
(Based on 1950 total collisions [1998-2003][20])

Description	CVC Section	Number of Collisions[21]	No Fault Assigned[22]	# of Motorists Assigned Fault	% of Motorists Assigned Fault[23]	# of Bicyclists Assigned Fault	% of Bicyclists Assigned Fault
District							
Circular Yellow or Yellow Arrow	21452	1	0	0	0	1	100
Failure of Slow Moving Vehicles to Turn Out	21656	1	0	0	0	1	100.
Tailgating	21704	1	0	0	0	1	100
Failure to Yield ROW at STOP Sign	21802	1	0	1	100	0	0
Failure to Yield ROW at Yield Sign	21803	1	0	1	100	0	0
Failure to Yield to Emergency Vehicle	21806	1	0	0	0	1	100
TOTALS		**1950**	**45**	**1068**	**56**	**823**	**43**

7. PROMOTION

PROMOTION GOALS AND OBJECTIVES

Goal:

Promote Safe Bicycling and Safe Bicycling Practices.

Objectives:

- Through community partnerships, identify funding, develop, and implement bicycle media campaigns and promotional materials to promote bicycling as a safe, healthy, cost-effective, environmentally beneficial transportation choice; and
- Target promotional materials to San Francisco's diverse population groups.

RECOMMENDED PROMOTION ACTIONS

City staff should prioritize the following policies and actions in order to implement the goals for improved promotion of bicycling in San Francisco:

Action 7.1
Promote the benefits of the Bicycle Route Network facilities to diverse age, income, and ethnic populations.

Action 7.2
Formalize bicycle education and promotion responsibilities and develop partnership agreements between the Department of Parking and Traffic (DPT) Bicycle Program; the Department of the Environment (SF Environment); the Department of Public Health (DPH); and other City agencies.

Action 7.3
Expand bicycle promotion and incentive programs for City employees to serve as a model program for other San Francisco employers.

Action 7.4
Include, where appropriate, telephone and web-based contact information for the Metropolitan Transportation Commission (MTC)'s "511" program on relevant DPT Bicycle Program materials.

Action 7.5
Encourage and promote bicycle related businesses within San Francisco.

INTRODUCTION

The continued development of new, improved, safe, and attractive bicycle facilities may prove to be the most effective means of increasing bicycle use in San Francisco. However, promotional strategies should also be pursued to enhance awareness of the benefits of bicycling for commute, shopping and recreational purposes, and to encourage safe bicycling practices.

The 1997 Bicycle Plan included a presentation of focused research on regional and local bicycle promotion programs existing at that time. The findings of this research included:

- the development of bicycle commute promotion programs under the umbrella of transportation demand management programs is limited by employers' concerns for employee safety and employer liability;
- the success rate of City and employer sponsored bicycle promotion programs is difficult to assess due to the fact that information on bicycle commuters before and after program implementation is not readily available; and
- bicycle commuting is generally overlooked as an automobile trip-reduction strategy.

Since this research was completed, bicycle promotion has evolved in San Francisco with multiple city agencies, non-governmental organizations, and employers expanding their promotion efforts. Before the bicycle will be seriously considered as a transportation choice by large numbers of commuters; the availability, feasibility, and benefits of bicycle commuting must be widely known. Many people are unaware of the opportunities that bicycle commuting can provide. Several strategies for promoting bicycle use for commuting and other purposes are discussed below and recommendations are presented for the continued development and improvement of each strategy.

It is important to recognize that there is substantial overlap between bicycle education, as presented in Chapter 5 of this plan, and bicycle promotion as discussed in this chapter. The primary distinction is that bicycle promotion focuses on appealing messages and incentives to attract people to the benefits of bicycling. Because of the need to diversify transportation options in the City and to attract new riders to the streets and pathways of San Francisco's growing Bicycle Route Network, it is appropriate to dedicate City resources to actively promote bicycling to new markets. Once new markets are identified through promotional activities, educational efforts are then more effectively employed to turn new bicycle riders into safe and committed bicyclists. Direct overlap between recommended promotional programs and educational programs is indicated in the chapter text.

Promotional activities should be targeted, utilizing the demographic information generated by the Metropolitan Planning Commission (MTC)'s Commuter Profile[1] to reach the expressed latent demand. However, promotional activities reaching out to new audiences and segments of San Francisco's diverse community should be undertaken. Building and assisting the San Francisco Bicycle Coalition (SFBC)'s outreach efforts, like the SFBC's Women and Bikes Profile[2], could assist in reaching many of the diverse San Francisco communities.

[1] Rides Commuter Profile 2003 *http://rideshare.511.org/research/commuterprofile2003.asp*

[2] http://www.sfbike.org/download/tubetimes/tt_040203.pdf

PROMOTION OF BICYCLE ROUTE NETWORK

Action 7.1 Promote the benefits of the Bicycle Route Network facilities to diverse age, income, and ethnic populations.

The Bicycle Route Network should be promoted to make potential users more aware of citywide bicycle trip potential between multiple neighborhoods, shopping districts, employment centers and other origins and destinations. Specific strategies for promoting the Bicycle Route Network include:

- distribute complementary printed Bicycle Route Network maps through appropriate channels, including employer commute programs, bicycle related events, bicycle shops, city-sponsored events, and other sources;
- develop a web-based bicycle trip planning system;
- post the Bicycle Route Network maps in high-visibility public locations such as transit stops, bus shelters, and other significant locations such as libraries, college campuses, and tourist destinations near the Bicycle Route Network; and
- nominate San Francisco for official recognitions such as the League of American Bicyclists (LAB) Bicycle Friendly Community award.

As the City continues to refine the Bicycle Route Network as outlined in Chapter 2 of this Plan, new bicycle facilities and major bicycle facility improvements should be promoted to encourage their proper use. DPT Bicycle Program staff should seek opportunities to partner with local nonprofit organizations, neighborhood groups, and other City agencies to educate City officials, City staff, local employers, and other citizens aware of the benefits of these new facilities. An explanation of the benefits of each bicycle facility should be developed as part of the project development and should be used to promote both its implementation and use.

San Francisco DPT ribbon cutting for the Duboce Pathway.

DEVELOP CITY-SPONSORED BICYCLE PROMOTION

Action 7.2 Formalize bicycle education and promotion responsibilities and develop partnership agreements between the Department of Parking and Traffic (DPT) Bicycle Program; the Department of the Environment (SF Environment); the Department of Public Health (DPH); and other City agencies.

DPT's Bicycle Program should serve as the coordinating agency for all City sponsored bicycle promotion efforts, and should be consulted by other City agencies regarding proposed bicycle promotion campaigns.

The DPT Bicycle Program should work cooperatively with the SF Environment, the DPH and the San Francisco Municipal Railway (Muni) on future promotion events by developing a task force to determine priorities and funding strategies. Prior "Bike to Work Day" and other events are examples of SF Environment's commitment to and excellence in event planning.

Once the above described responsibility is determined by an interagency operating agreement, DPT and other City agencies should work to promote a better understanding of the benefits of bicycling for utilitarian and recreational purposes. Environmental, health, and cost benefits are examples of areas in which promotional efforts could focus. The DPT Bicycle Program website should be updated to include features on the benefits of bicycling and should provide links to other City websites that promote the benefits of bicycle use.

The San Francisco City Hall bike room provides secure bike parking and locker facilities for City staff.

The above discussion of agency responsibility and the City's role in promoting the benefits of bicycling to the general public is also discussed in detail in Chapter 5 - Education, under Actions 5.1 and 5.2.

CITY STAFF PROGRAMS AND POLICIES FOR BICYCLE USE

Action 7.3 Expand bicycle promotion and incentive programs for City employees to serve as a model program for other San Francisco employers.

There are a wide variety of potential strategies available to the City in order to promote increased bicycle use by City employees for both commute to work and on the job purposes.

The following specific programs should be implemented:

- City bicycle pool, similar to existing pool of City motor vehicles. The Bicycle Program Manager should work with the SF Environment's Clean Air Program Coordinator to acquire bicycles for this purpose. Bicycle parking facilities, helmets, safety vests, and training would be needed in addition to bicycles;
- Development of a reimbursement program for City employees' use of personal bicycles, similar to existing programs for reimbursement of personal vehicle mileage or use of a City CarShare vehicle;

- Development of a program to substitute fleet purchase of bicycles in lieu of City vehicle purchase for specific agencies and positions where bicycles could provide a viable means of job-related transportation; and

- Development of specific campaign efforts to include bicycle promotion materials in City correspondence such as a special message from the Mayor's office, agency and department directors, or as an inclusion in City pay check distributions.

There is direct overlap with the discussion of City staff bicycle promotion in Chapter 5 - Education, under Action 5.7 and 5.8.

BICYCLE EVENTS

Themed events held in San Francisco often attract regional and sometimes even national attention and offer the City and other organizations an opportunity to reach many people with promotional messages. To make the most of the promotion potential of these events, messages should be targeted to likely audiences. Potential audiences include bicycle commuters, potential bicycle commuters, recreational bicyclists, and non-bicyclists.

"BIKE TO WORK DAY"

"Bike to Work Day" is an annual event celebrated in many municipalities across the country that encourages people to commute by bicycle. In San Francisco, participants enjoy complimentary coffee, treats, and receive a free "goodies" tote bags from one of many neighborhood "energizer stations" located throughout the City. Participants are also eligible for a drawing of prizes. In recent years, "Bike to Work Day" has been coordinated by SFBC with assistance from MTC and SF Environment.

San Francisco Mayor Gavin Newsom with SFBC staff, DPT staff and others during the 2004 Bike to Work Day.

Additional participation from appropriate City agencies including DPT, SF Environment, and DPH could serve to expand the scope, participation, and influence of this event. The involvement of the San Francisco Mayor and members of the Board of Supervisors has served to elevate the event's profile. The participation of greater numbers of City employees could serve to expand the scope of the event significantly.

This event is a clear opportunity for expanded promotional efforts related to bicycle commuting. Bike-to-Work Week, Car Free Day, and Earth Day are other existing events which could be expanded to encourage more participation.

BICYCLE RACING

San Francisco serves as host to an increasing number of recreational and competitive bicycle events, of an increasingly international stature. The San Francisco Grand Prix dwarfs all other events in terms of budget and popular interest. The spectator volumes at this event have increased each year that it has been held, beginning in 2001. Potential partnerships with race promoters or organizations (such as the Northern California/Nevada Cycling Association, www.ncnca.org) could serve to incorporate broader bicycle promotion into the theme of the event.

Scene from the San Francisco Grand Prix 2003

There are several other bicycle events held in or passing through San Francisco. Among these are two AIDS fundraising bicycle rides, Giro di San Francisco, and the Go Greenbelt bicycle tour that circumnavigates the entire Bay to promote open space preservation. Although these events are smaller than the San Francisco Grand Prix, they do provide an opportunity for distributing safety and bicycle commuting promotional materials.

The SFBC and SF Environment have distributed bicycle promotional materials at past events and should work with other City agencies to expand their efforts.

BICYCLE INFORMATION RESOURCES: MTC 511 PROGRAM

Action 7.4 Include, where appropriate, telephone and web-based contact information for Metropolitan Transportation Commission (MTC)'s "511" program on relevant DPT Bicycle Program materials.

The MTC 511 program is a "toll-free phone and Web service that consolidates Bay Area transportation-related information into a one-stop resource. This easy three-digit number provides up-to-the-minute information on traffic conditions and incidents, details on public transportation routes and fares, instant carpool and vanpool referrals, bicycling information and more.[3]"

STREET FAIRS AND FESTIVALS

Other large events in San Francisco such as street fairs, the Festival d'Italia, the Cherry Blossom Festival, and July 4th fireworks are required to provide bicycle access with secure bicycle parking (see Chapter 3; page 3-16). As part of the event advertising, the best bicycle route to the event

[3] http://www.511.org

should be published along with the location of the bicycle parking. Street fairs and festivals are also potential distribution sites for bicycle promotion materials.

BICYCLE RELATED BUSINESSES

Action 7.5 Encourage and promote bicycle related businesses within San Francisco.

San Francisco has many bicycle related businesses that serve the community, the most visible of these being the San Francisco bicycle messengers. Promotional efforts encouraging bicycling in the City should include San Francisco's bicycle messengers, particularly their laudable efforts of creating a volunteer disaster response team.[4]

Promotional material should also be developed to centralize information regarding pedicabs (bicycle taxis), bicycle rentals, bicycle shops, bicycle messenger services, and stores that are bicycle friendly (allowing cyclists to bring their bicycles inside, offering 'shop by bike discounts', providing secure bicycle parking, etc.) This material could serve many different bicycle users within the City, from the visiting tourist to the seasoned urban cyclist.

[4] The Courier Disaster Response Team are bicycle messengers trained to respond in time of a large scale disaster, committed to transporting supplies and messages in a time of need.

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8. GENERAL PLAN AMENDMENTS, ENVIRONMENTAL REVIEW, AND CITYWIDE COORDINATION

Goal:

Adopt Bicycle-Friendly Practices and Policies

Objective:

Integrate consideration of bicycle travel into all roadway planning, design, and construction.

RECOMMENDED GENERAL PLAN AMENDMENT ACTIONS

City staff should prioritize the following policies and actions and amend the San Francisco General Plan so that it provides a policy framework for improvement of bicycle facilities:

Action 8.1
Incorporate this Bicycle Plan in whole by reference into the General Plan and amend sections of the General Plan that are relevant to bicycling, including the Transportation Element and Downtown Area Plan, according to the goals of the Bicycle Plan.

Action 8.2
Adhere to the process for General Plan amendments as required for subsequent amendments and updates to the Bicycle Plan and Bicycle Route Network.

Action 8.3
Ensure that all current and proposed Area Plans' objectives and policies are consistent with the goals of the San Francisco Bicycle Plan. Whenever updates or revisions are considered to existing Area Plans, especially those that do not now contain sections on bicycling, these Area Plans should include sections on bicycling consistent with the goals of the Bicycle Plan. These current Area Plans include: Central Waterfront, Chinatown, Civic Center, Rincon Hill, and South of Market.

Action 8.4
Update the Planning Department's "Guidelines for Environmental Review: Transportation Impacts," to ensure adequate accommodation of bicycles.

Action 8.5
Ensure that non-automated traffic counts conducted as part of any City transportation or development study include: bicycle counts at the same locations where motor vehicles are counted; an inventory of existing bicycle parking within a two-block radius of the study site;

and the project's impacts on any existing or proposed bikeways designated in the General Plan.

Action 8.6
Consult DPT regarding any proposed bicycle facilities, namely public agencies with jurisdictions or rights-of-way within the City and County of San Francisco.

INTRODUCTION

California law requires that a jurisdiction's General Plan address seven issues: land use, transportation, housing, conservation, open space, noise, and safety. In addition to these required elements, the San Francisco General Plan contains sections on commerce and industry, community facilities, urban design, and the arts. The General Plan also contains 10 Area Plans, which focus on specific geographic regions within the City. In 1995 the San Francisco Charter was amended to adopt the General Plan as the guiding law of the City, not just as an advisory document, and to require that any amendments to the General Plan be approved by the Board of Supervisors (BOS).

In conjunction with the completion and adoption of this Bicycle Plan, a number of amendments will be proposed to San Francisco's General Plan, particularly the Transportation Element and the Downtown Area Plan, each of which currently contain sections on bicycling, in order to achieve the goals of the San Francisco Bicycle Plan. These proposed amendments include specific mention of, and incorporation by reference, the Bicycle Plan as an adopted complimentary component of the city's General Plan. This chapter recommends that, as other Area Plans are updated, they include objectives and polices for bicycling, and that the "Planning Department's Guidelines for Environmental Review: Transportation Impacts" be amended. Finally, recommendations are made for amending the City's current Level Of Service (LOS) standards and methodologies to be more consistent with existing General Plan Objective 10, which calls for the City to "develop and employ methods of measuring the performance of the City's transportation system that respond to its multi-modal nature."

RECOMMENDED AMENDMENTS TO THE TRANSPORTATION ELEMENT OF THE GENERAL PLAN

Action 8.1 Incorporate this Bicycle Plan in whole by reference into the General Plan and amend sections of the General Plan that are relevant to bicycling, including the Transportation Element and Downtown Area Plan, according to the goals of the Bicycle Plan.

Action 8.2 Adhere to the process for General Plan amendments as required for subsequent amendments and updates to the Bicycle Plan and Bicycle Route Network.

The Transportation Element of the General Plan is composed of sections dealing with important components of the local and regional transportation system. Section 7 deals with Bicycle Transportation. The introduction to this section states:

> The bicycle is a desirable alternative to the automobile as a means of urban transportation in San Francisco. It can successfully be used for most transportation needs, including commuting, shopping, errands, and recreation. Active encouragement of bicycle use as an alternative to automobile use, whenever possible, is essential in light of the continually increasing traffic congestion caused by motorized vehicles which aggravates air pollution, increases noise levels and consumes valuable urban space. The bicycle is a practical and economical transportation alternative which produces no emissions or noise. In addition, each bicycle user enjoys health benefits through increased physical activity.
>
> To enable a large number of San Franciscans to use the bicycle as a transportation option, several significant needs must be met. The needs include, among others, safe and comfortable space on the roadway for bicyclists, a properly signed Bicycle Route Network that direct bicyclists to major destinations, safe and secure bicycle parking, and education of both the bicyclists and motorists about the safe sharing of the roadways.

The Transportation Element was last amended and adopted in 1995. This amendment process was concurrent with the 1997 Bicycle Plan and many of the 1997 Bicycle Plan's recommendations for changes to the Transportation Element were incorporated during the General Plan amendment process. However, these amendments did not include specific mention of, or reference to, the Bicycle Plan as an adopted complimentary component of the city's General Plan. Based upon the work of the 1997 Bicycle Plan, a map of the Bicycle Route Network was included and designated within the San Francisco General Plan Transportation Element. As changes to the network occur, periodic updates of the Bicycle Route Network within the San Francisco General Plan should occur.

RECOMMENDED AMENDMENTS TO OTHER AREA PLANS

Action 8.3 Ensure that all current and proposed Area Plans' objectives and policies are consistent with the goals of the San Francisco Bicycle Plan. Whenever updates or revisions are considered to existing Area Plans, especially those that do not now contain sections on bicycling, these Area Plans should include sections on bicycling consistent with the goals of the Bicycle Plan. These current Area Plans include: Central Waterfront, Chinatown, Civic Center, Rincon Hill, and South of Market.

While the Downtown Area Plan already contains a section that deals specifically with bicycling, several of the General Plan's Area Plans do not now address bicycling, or do not address it fully. When undertaking updates or revisions to existing Area Plans (including planning efforts meant to supplement or replace existing Area Plans, such as the Better Neighborhoods), or when adopting new Area Plans, the Planning Department should ensure that their goals and objectives are consistent with the goals and objectives of the San Francisco Bicycle Plan and include sections on bicycling as appropriate.

RECOMMENDED AMENDMENTS TO GUIDELINES FOR ENVIRONMENTAL REVIEW: TRANSPORTATION IMPACTS

Action 8.4 Update the Planning Department's "Guidelines for Environmental Review: Transportation Impacts," to ensure adequate accommodation of bicycles.

The "Guidelines for Environmental Review: Transportation Impacts," published by the Department of City Planning for consultants who are conducting transportation analyses for both Environmental Impact Reports and Negative Declarations, should be amended. The Guidelines were last updated in 2002 and cite the 1997 Bicycle Plan as a source. The Guidelines include Section E. Bicycle Impacts (shown below) in the Study Report Preparation Guidelines:

> The existence of current or future bicycle facilities in the area should be identified from the San Francisco Bicycle Plan and by consultation with the Department of Parking and Traffic. The analysis should examine possible impacts on bicycle traffic on the streets in the vicinity of the project. This would include potential conflicts between auto, truck and bus traffic serving the project during loading and unloading, and potential conflicts due to turning movements across bicycle lanes or routes. Potential barriers or hazards to safe bicycle operations near the project should also be identified. Other conditions that may have a notable negative or positive impact on use, such as bicycle parking or the provision of shower facilities, should also be stated. Details regarding the location and access to any bicycle facilities included in the project should be described in the textual discussion and clearly shown on the site plan included in the background transportation report. The information provided needs to be sufficient to ascertain whether the proposed bicycle facilities would be secure and practical for bicyclists to use.
>
> If sufficient bicycle traffic exists or is anticipated on a study area street, it may be necessary to include a quantitative analysis of the impacts using the methodology in the 2000 Highway Capacity Manual or some similar technique.

The Guidelines state that if "sufficient bicycle traffic exists or is anticipated on a study area street, it may be necessary to include a quantitative analysis of the impacts." The Guidelines should be updated to specifically define "sufficient bicycle traffic," using a quantifiable standard.

The Guidelines require that a Transportation Report be prepared if a proposed project has elements that have the potential to adversely affect bicycle safety or the adequacy of nearby bicycle facilities. The project description must include:

- Identification of the location, number and type of bicycle parking spaces to be provided;
- Illustration of all designated bicycle routes in the study area;
- Description of existing treatments for bicycles, and any proposed treatments for bicycle routes, as well as general characterization of the extent of bicycle usage;
- Comparison of the amount of parking to be provided for bicycles with Code requirements; and

- Identification and mitigation of any traffic impacts or conflicts of parking access with streets identified for full or partial priority for bicycles, and any potential conflicts affecting bicycle traffic flow.

Whenever on-site parking is proposed, sufficient details must be included to the extent possible in order to assess potential for conflicts with bicycles and sufficient details must be included to the extent possible in order to assess the quantity, locations, access, safe and secure character, and provisions for associated showers and lockers for all bicycle parking spaces whenever required or provided. The locations for garbage and recycling pick-up operations must be situated to minimize the potential for disruptions to bicycle circulation. Mitigation measures cited include provision of off-street bicycle storage pursuant to Section 155 of the City Planning Code, provision of secure bicycle facilities for project commuters and short-term visitors, which would, at a minimum, provide safe shelter for the number of spaces required in the project, and encouragement of bicycle use.

Action 8.5 Ensure that non-automated traffic counts conducted as part of any City transportation or development study include: bicycle counts at the same locations where motor vehicles are counted; an inventory of existing bicycle parking within a two-block radius of the study site; and the project's impacts on any existing or proposed bikeways designated in the General Plan.

The "Guidelines for Environmental Review: Transportation Impacts" should be amended to include the following items, which were recommend in the 1997 Bicycle Plan but were not incorporated into the Guidelines:

- All traffic counts conducted as part of the study must include bicycle counts at the same locations where motor vehicles are counted;

- An inventory of existing bicycle parking must be conducted within a two-block radius of the project site; and

- Mitigation measures should not include any action that would compromise bicycle travel such as the narrowing of a curb lane on any street, nor re-striping or widening to provide a double right-turn lane where the second lane is a shared through-right lane.

Proposed street changes result from new development – as well as parking modifications, or changes to the roadway configuration, such as the addition or elimination of turn lanes at a specific intersection. All proposed street changes are currently reviewed by DPT, including its Bicycle Program. The impacts of street changes are specifically addressed and recommendations are often made to improve conditions for cyclists and to ensure that cyclists' experience is not degraded. All new developments requiring an EIR are reviewed by DPT. The EIR review includes the following four items:

- Consistency with the General Plan and Bicycle Plan;
- Impact on the existing Bicycle Route Network;

- Safety of bicycle operations are based on project conformity to accepted design standards and guidelines

COORDINATION WITH OTHER JURISDICTIONS WITHIN SAN FRANCISCO

Action 8.6 Consult DPT regarding any proposed bicycle facilities, namely public agencies with jurisdictions or rights-of-way within the City and County of San Francisco.

The DPT Bicycle Program meets as necessary with staff of other agencies that have jurisdiction within San Francisco to discuss proposed bicycle plans and facilities within San Francisco. These agencies include the Golden Gate National Recreation Area, the Presidio Trust, the California Department of Parks & Recreation, Caltrans, the Metropolitan Transportation Commission, the Golden Gate Bridge, Highway and Transportation District, the Association of Bay Area Governments, and the Bay Area Ridge Trail Council. Major projects discussed include the Bay Bridge West Span Bicycle Path, the Bay and Ridge Trails, the Presidio Bicycle Plan, and the Crissy Field Wetlands Restoration.

The DPT Bicycle Program, as the City's liaison to other agencies on San Francisco bicycle plans, projects and programs, will continue to meet with these agencies' staff members. The staff of these other agencies should include DPT Bicycle Program staff in all discussions and review of any San Francisco bicycle projects.

GLOSSARY

ACWS	Asphalt Concrete Wearing Surface
ABAG	Association of Bay Area Governments
BBATF	BART Bicycle Accessibility Task Force
BAAQMD	Bay Area Air Quality Management District
BAC	Bicycle Advisory Committee
BART	Bay Area Rapid Transit
BAFUL	Bicycles Allowed Full Use of Lane
BATA	Bay Area Toll Authority
BFU	Caltrans Bicycle Facilities Unit
BOS	Board of Supervisors
BTP	Bicycle Transportation Plan
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CTCDC	California Traffic Control Device Committee
CVC	California Vehicle Code
CMA	Congestion Management Agency
DPT	Department of Parking and Traffic
DPH	Department of Public Health
DPW	Department of Public Works
EMS	Emergency Medical Services Division
EIR	Environmental Impact Report
GGBHTD	Golden Gate Bridge Highway and Transportation District
GGNRA	Golden Gate National Recreation Area
GGT	Golden Gate Transit
GIS	Geographic Information System
HDM	Caltrans Highway Design Manual
HNBD	Has Not Been Drinking
ISCOTT	Interdepartmental Staff Committee on Traffic and Transportation
ISTEA	Inter-modal Surface Transportation Efficiency Act
ITS	Intelligent Transportation System
LAB	League of American Bicyclists
LOS	Level of Service
LRV	Light Rail Vehicle
MEA	Major Environmental Analysis
MMC	methyl methacrylate
MPO	Metropolitan Planning Organization
MTA	San Francisco Municipal Transportation Agency
MTA CAC	Municipal Transportation Agency Citizen's Advisory Council
MTC	Metropolitan Transportation Commission
MUTCD	Federal Manual of Uniform Traffic Control Devices
Muni	San Francisco Municipal Railway
OTS	Office of Traffic Safety
OC	Oversight Committee
PCO	Parking Control Officer

APPENDIX A. SUPPLEMENTAL DESIGN GUIDELINES

DOCUMENTS DEPT.

FEB 10 2005

SAN FRANCISCO
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PJPB	Peninsula Joint Powers Board (Caltrain)
PMS	Pavement Management System
ROW	Right-Of-Way
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SAR	Strategic Analysis Report
SCCC	Street Construction Coordination Center
SFBC	San Francisco Bicycle Coalition
SFCTA	San Francisco County Transportation Authority
SF Environment	Department of the Environment
SFFD	San Francisco Fire Department
SFGH	San Francisco General Hospital
SFPD	San Francisco Police Department
SFRA	San Francisco Redevelopment Agency
SFUSD	San Francisco Unified School District
Sharrow	Shared Lane Pavement Marking
SR2S	Safe Routes to School
STIP	State Transportation Improvement Program
SWITRS	Statewide Integrated Traffic Records System
TC	San Francisco Traffic Code
TDA	Transportation Development ACT
TEA-21	Transportation Equity Act of the 21st Century
TFCA	Transportation Fund for Clean Air
TWG	Technical Working Group

City of San Francisco
Bicycle Plan Update:
Supplemental Design Guidelines

September, 2003

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Introduction

The City of San Francisco has been working for the past decade to implement on-street bikeway projects in order to encourage cycling, improve safety, and improve the quality of bicycling so that it becomes an integral part of daily life. Because San Francisco is a completely built-out urban environment, almost all projects involve retrofitting existing streets and intersections. San Francisco has challenging topography, a high demand for on-street parking, extremely high volumes of transit and motor vehicle traffic, and many complex situations. When looking to implement bike lanes or other improvements on San Francisco's streets, the standard design manuals offer limited solutions for San Francisco.

The San Francisco Supplemental Design Guidelines are a compliment to the 2003 San Francisco Bicycle Plan Update. These design concepts are intended to supplement the bikeway design guidelines for typical bikeway situations provided in Caltrans Highway Design Manual (HDM) Chapter 1000, the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, and the Manual of Uniform Traffic Control Devices (MUTCD) 2000, Part 9 Traffic Controls for Bicycle Facilities. These treatments draw upon creative solutions in use in other locations in California, other States, and European cities. These designs are conceptual at this stage, and must be reviewed further before being applied to actual situations. It should be noted that for several of the designs, more than one option is presented. In these cases, ultimately one preferred design should be selected. Strong design guidelines will allow the City of San Francisco to improve the quality of the bicycle network by applying the highest standard of bicycle safety, comfort, and convenience.

This document does not attempt to replace material covered within the HDM, AASHTO Guidelines, or MUTCD, but rather, to clarify local treatments of bicycle facility design. This document will be approved by the Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT) and represents the common interests and support of the City and County of San Francisco's departments and agencies. Caltrans HDM Chapter 1000, Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, and the Manual of Uniform Traffic Control Devices (MUTCD) should be referenced and the use of this document should be supplemental as the name implies.

As part of the Master Plan, the City will be applying the design solutions found in the Supplemental Design Guide to individual sites. These sites were selected as high priorities for improvements based on safety, connectivity, potential cycling usage, and popular support criteria. Once implemented, each site will be carefully monitored, at which time the City will assess the design and make recommendations regarding the its further application.

Clarifications on Terminology

"SHALL" or "MUST"	All language that is explicitly stated as such, is referenced within Caltran's HDM, MUTCD, AASHTO's Guide for The Development of Bicycle Facilities, or other traffic engineering manuals. The San Francisco Supplemental Design Guidelines conforms to these overriding documents.
"SHOULD"	All language that is suggestively stated as such, represents a "best practices" guideline that should be followed, but is still open for interpretation depending on a multiple of local factors including; topography, lane widths, vehicle speeds, collision history, etc. Suggestive guidelines can not conflict with these explicit standards.
"MAY"	All language that is conditionally stated as such, represents a guideline that could be followed in San Francisco. Conditional guidelines are dependant on multiple variables. Often times they should be coupled with a "before and after" study to determine their effectiveness. They can not conflict with explicit standards set forth in the HDM, MUTCD, or AASHTO's Guide for The Development of Bicycle Facilities.

1A. BIKE LANE DESIGNS: GUIDELINES

DESCRIPTION

BICYCLE LANE WIDTH

RECOMMENDED GUIDELINE:

Bike lanes alongside parking lanes shall be at least 5' wide. They may be widened to 6' if space is available and the parking lane has been widened to 9'. Bike lanes alongside curbs shall be at least 4' wide, with 3' minimum from gutter joint to the bike lane stripe. Curbside bike lanes should be 5' wide, and may be wider if necessary and space is available. Bicycle lanes >5' alongside parking lanes may be desirable with one or more of the following conditions:

- Traffic volumes (including truck or bus volumes)/speeds are high
- Bicycle volumes are high
- Wider bike lane will not encourage illegal parking or driving in the bicycle lane to bypass congestion

Bike lanes are typically dashed from 100' in advance of intersections to the intersection in order to warn cyclists of impending conflicts and to allow motorists to travel across the bike lane to turn or merge as required in the California Vehicle Code. The dashed length may be of a shorter distance in special situations, such as short blocks.

MINIMUM STANDARD:

The minimum standard for bicycle lane width is established in Highway Design Manual Chapter 1000 as 4' in width. The minimum standard for bicycle lane width adjacent to parking is 5' in width.

PARKING LANE WIDTH

RECOMMENDED GUIDELINE:

The recommended guideline for parking lane width is 8' . Parking lanes may be of narrower width if specifically required for other modes, with preference to transit over motor vehicle traffic.

9' parking lane width is recommended where one or more of the following conditions exists (assuming space is available):

- Parking turnover is high (metered parking, commercial areas)
- Higher concentration of wide vehicles in parking lane (trucks, buses, etc)
- It is preferable to narrow travel lanes to encourage slower speed
- Widening the parking lane moves the bike lane away from the curb and keeps motorists near the middle of the road, increasing sight distances for traffic on cross-streets

MINIMUM STANDARD:

The minimum standard for parking lane width is 7'. A 7' parking lane width is acceptable with one or more of the following conditions:

- Low parking turnover (neighborhood streets)
- Uphill bike lane (slow cycling speeds)
- Space constraints do not allow for wider parking lane

TRAVEL LANE WIDTH

RECOMMENDED GUIDELINE:

Travel lanes adjacent to a bike lane should be 10' in width. In the absence of designated truck routes and/or high capacity transit lines, additional curb to curb width should be allocated according to the following priority: (1) bicycle and pedestrian circulation, (2) transit operations, and, (3) private vehicle operations.

Travel lanes should be greater than 10' when the following circumstances exist:

- Roadway is posted at greater than 30 mph
- Roadway is a transit (including MUNI) route
- Roadway is a designated truck route, with oversized vehicles common

1B. BIKE LANE DESIGNS FOR TWO-WAY STREETS

DETAILS

Bike Lane Markings All striping must be non-skid material.

Preferred marking material: Thermoplastic or other non-slick retroreflective material.

Bike Lane Stripe: 6" wide

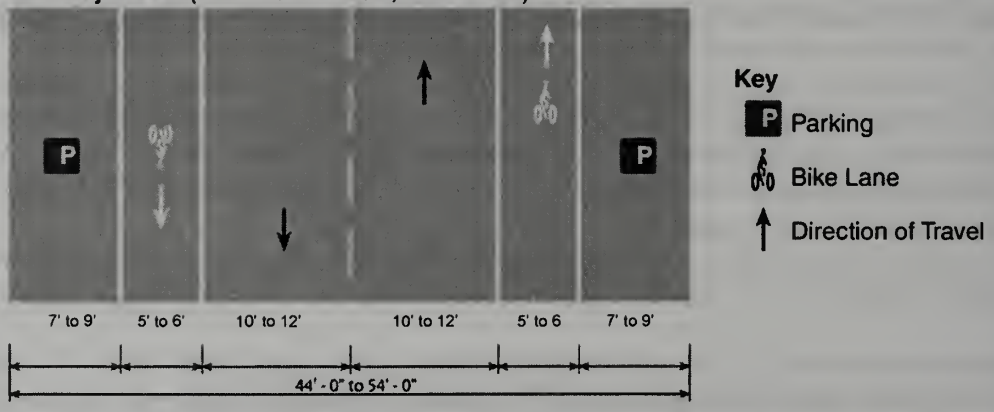
Parking Lane Stripe: 4" wide

Spacing Between Bike Stencils: Stencil spacing will be determined base on block length, parking turnover, land use, and other relevant factors.

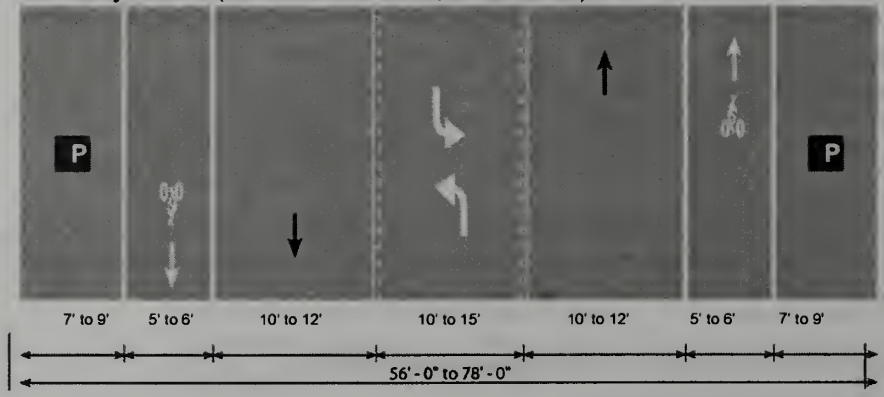
Optional Treatment:: Colored lanes (dyed or thermoplastic) may be considered in addition to striping of bicycle lanes.

GRAPHIC

Two-Way Street (44'-0" - 54'-0" width, curb to curb)



Two-Way Street (56'-0" - 78'-0" width, curb to curb)



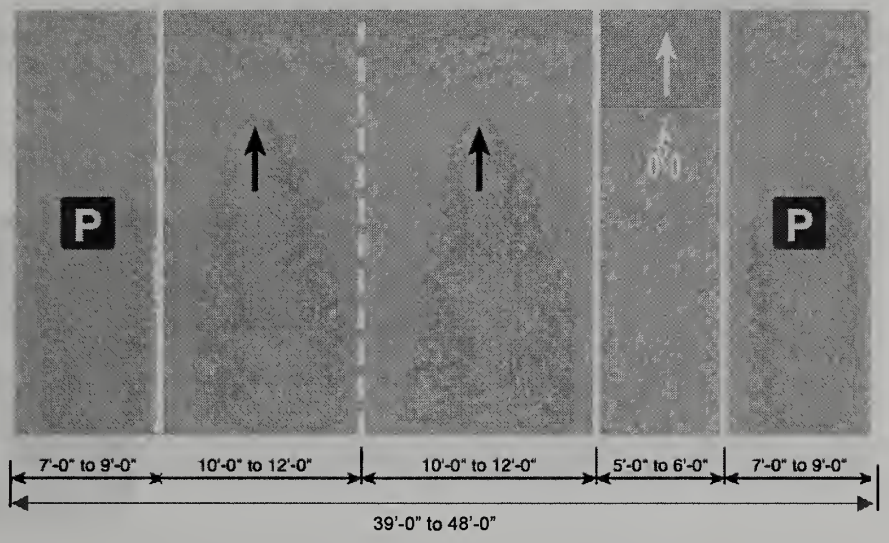
1C. BIKE LANE DESIGNS FOR ONE-WAY STREETS

DESCRIPTION

The bike lane designs and guidelines for one-way streets are similar to those of two-way streets. On typical streets with on-street parking, a bicycle lane should be 5' in width. The previous pages summarize the recommended and minimum widths for bicycle lanes, parking lanes, and travel lanes.

On one-way transit streets, bike lanes on the opposite side of the street should be considered.

GRAPHIC



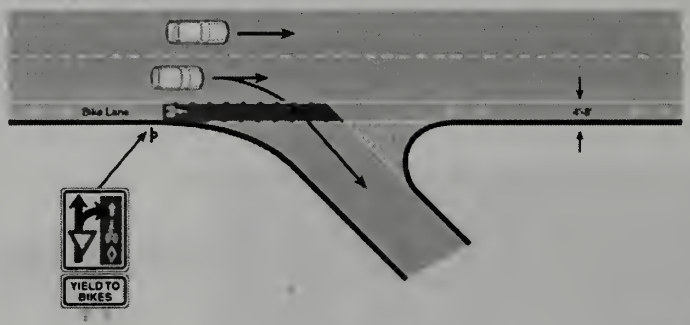
2. COLORED BIKE LANE TREATMENT THROUGH A CONFLICT AREA

DESCRIPTION

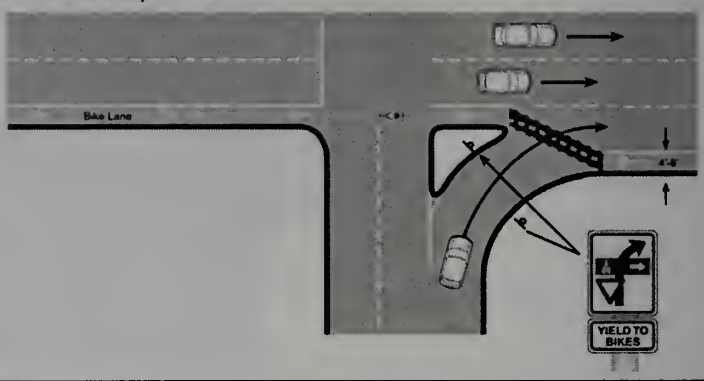
Colored bike lanes could be used in high-conflict areas, to alert drivers of the presence of bicyclists and bicycle lanes. These areas can be painted or treated with a thermoplastic. Typically, yield signs that instruct bicyclists and drivers about the lanes are installed wherever the colored lane treatments are used. An alternative use of colored bicycle lanes, mentioned above under "Optional Treatment" for 1B, would be to provide continuous colored bicycle lanes with a discontinuation of the coloration at conflict areas. Determination of the most effective treatment requires further study.

GRAPHIC

Exit Ramp Zone



Entrance Ramp Zone



POTENTIAL APPLICATIONS

- High volume of vehicles turning across bike lane to exit or enter a roadway in a ramp-like configuration. This should not be used in typical 4-legged intersection situations that simply have a high volume of turning motor vehicles.
- Roadways / ramps merge at angles where motorist sight distance is impaired, or that cause motorists to be looking to merge in such a way that they may not see cyclists in a normally-marked bike lane.
- High volume of bicyclists
- Cyclists have priority movement

Other potential situations for application of colored bike lanes include:

- Contra-flow bike lanes
- Left-side bike lanes on high volume roads
- Bike-only left-turn pockets

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Portland, OR
- Cambridge, MA
- Montreal
- Denmark
- New York City

NOTES

National committees are currently reviewing the use of color for bike lane situations. Should they make a recommendation for green or other colors, the design would use the recommended coloring. Coloring should also be coordinated with colored MUNI transit lanes that are being studied. Use of this type of lane may also require changes to the California Vehicle Code. The City of Portland conducted a study of colored bike lanes through conflict zone, demonstrating that motorists yield to bicyclists 92 percent of the time (compared to 72 percent of the time before colored bike lane implementation). Fewer bicyclists approaching the conflict area looked for oncoming traffic after the blue pavement was put in place.

3A. INTRODUCTION TO BICYCLE/TRANSIT DESIGN GUIDELINES

BICYCLES AND TRANSIT POLICY

Planning for and implementation of bicycle facilities on transit routes requires an agreed-upon rationale for the placement of bicycle facilities. This policy is established in Chapter 4: Implementation of the San Francisco Bicycle Plan.

DRAFT POLICY STATEMENT*

When a bicycle facility or project is proposed for an existing transit route, the Department of Parking and Traffic Bicycle Program (DPT) bicycle program staff will review existing data on transit operations and present to MUNI a project description in order to initiate a project specific review. DPT will inform MUNI staff of the proposed project to identify specific data needs. MUNI and DPT staff will work collaboratively to determine the specific steps required to demonstrate project viability. In the event that the proposed bicycle facility is demonstrated to negatively impact transit operations based on transit service schedules or transit rider safety, then the project will not be recommended.

*This policy will be developed for the Draft Bicycle Plan Update and incorporated in the final Update based on DPT and MUNI staff input. This current page in the Supplemental Design Guideline serves as a draft and placeholder.

BICYCLES AND TRANSIT DESIGN GUIDELINES

Where bicycle facilities are shown to be compatible with existing or planned transit facilities based on DPT/MUNI study of design alternatives, diagrams 3B, 4A, and 4B should be followed. These diagrams specifically related to shared bicycle and transit streets.

Additional transit related diagrams may be added to this Supplemental Design Guidelines document as required to address specific recurring circumstances involving bicycles and transit vehicles.

3B. TRANSIT STOP STRIPING: SHARED BUS/BICYCLE LANE

DESCRIPTION

The shared bus/bicycle lane should be used where width is available for a bus lane, but not a bus and bike lane. The dedicated lane attempts to reduce conflicts between bicyclists, buses, and automobiles. Various cities have experimented with different designs and there is currently no evidence of one design being more effective than the others.

POTENTIAL APPLICATIONS

- On auto-congested streets, moderate or long bus headways
- Moderate bus headways during peak hour
- No reasonable alternative route

GRAPHIC

NOTES

The diamond marking for bus-only lanes is being changed. This design should be updated with the new marking (yet to be determined).

Taxis and right turning vehicles are also allowed in transit lanes. A clear sign design that conveys who is allowed use of a transit lane needs to be developed.

SELECTED LOCATIONS WHERE TREATMENT IS BEING USED

- Madison, WI
- Vancouver, Canada
- Toronto, Canada
- Philadelphia, PA
- Berlin, Germany

4A. TRANSIT STOP STRIPING: FAR SIDE BUS ZONE

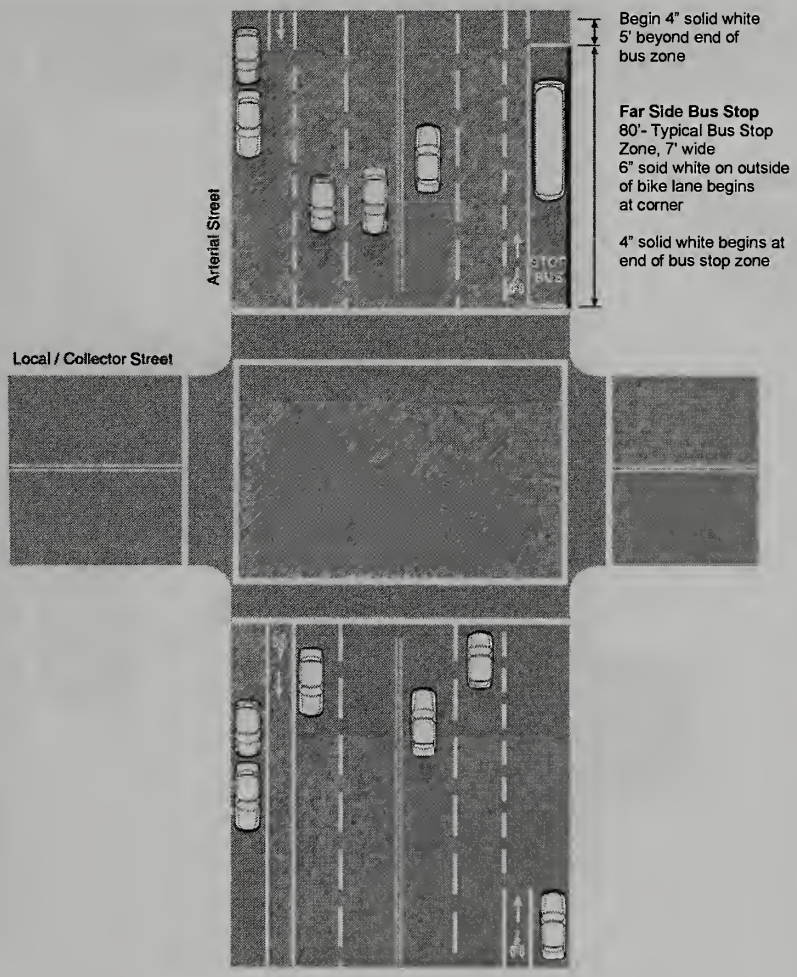
DESCRIPTION

This guideline details the striping of bike lanes adjacent to far-side bus zones. The bus zone will have a white striped box with BUS STOP marked inside. The bus zone box will serve as the inside demarcation between buses/bicycles. The outside bicycle lane stripe should be dashed from the crosswalk to end of the bus zone.

POTENTIAL APPLICATIONS

- When bus stops are located on the far side of intersections

GRAPHIC


Begin 4" solid white 5' beyond end of bus zone
Far Side Bus Stop
80'- Typical Bus Stop Zone, 7' wide
6" soid white on outside of bike lane begins at corner
4" solid white begins at end of bus stop zone
Arterial Street
Local / Collector Street

NOTES

This treatment is currently being used in San Francisco.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Philadelphia
- San Francisco

4B. TRANSIT STOP STRIPING: NEAR SIDE BUS ZONE

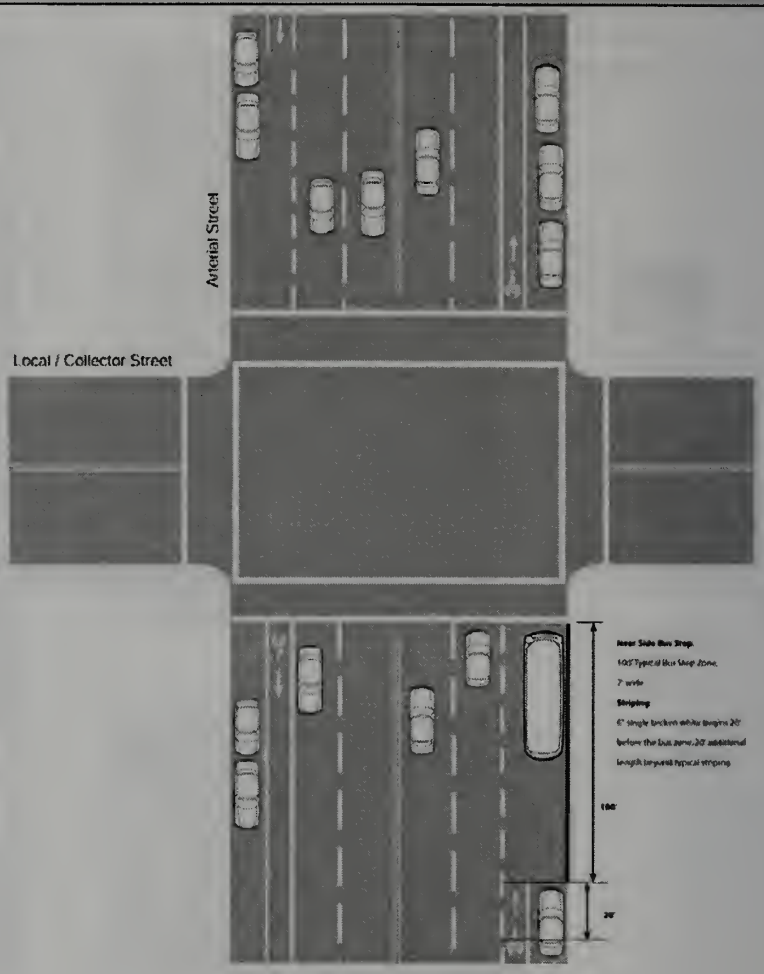
DESCRIPTION

This guideline details the striping of bike lanes adjacent to near-side bus zones. The solid right line of the approaching bike lane will stop 5 feet before the bus box and the left side of the bus box serves as the right bike lane stripe.

POTENTIAL APPLICATIONS

- When bus stops are located on the near side of intersections

GRAPHIC



NOTES

This treatment is currently being used in San Francisco.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Philadelphia
- San Francisco

5. CONTRA-FLOW BIKE LANE

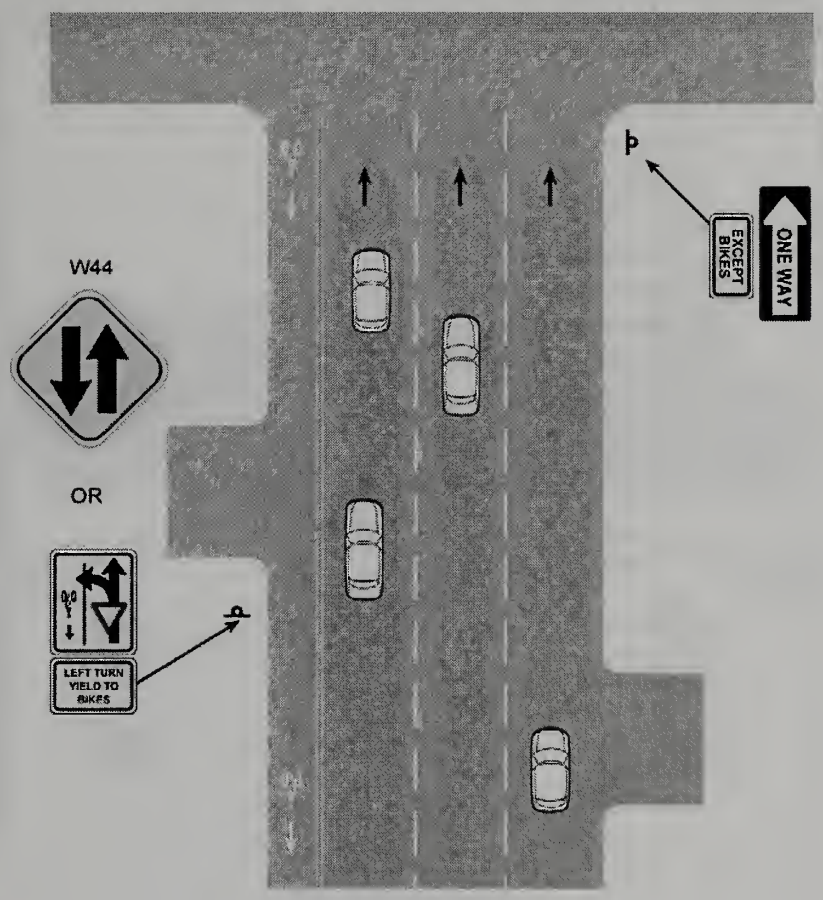
DESCRIPTION

The contra-flow bicycle lane provides a striped lane going against the flow of automobile travel. The lanes should be separated by a double-yellow line.

POTENTIAL APPLICATIONS

- Provides direct access to key destination
- Improves safety
- Infrequent driveways on bike lane side
- Bicyclists can safely and conveniently re-enter traffic at either end
- Sufficient width to provide bike lane
- No parking on side of street with bike lane
- Existing high bicycle usage of street
- Less than three blocks in length
- No other reasonable route for bicyclist

GRAPHIC



NOTES

This type of treatment should only be considered after all other methods to accommodate bicycles along a corridor have been considered. This treatment is to be considered the exception, and not the rule, for one-way streets. As a part of trial implementation, an effective sign design to accompany this treatment needs to be determined. A standard two way traffic warning sign (W44) may be most appropriate.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Portland, OR
- Madison, WI
- Cambridge, MA
- San Francisco (The Presidio)

6. BICYCLE STREAMING LANE (BIKE BOX)

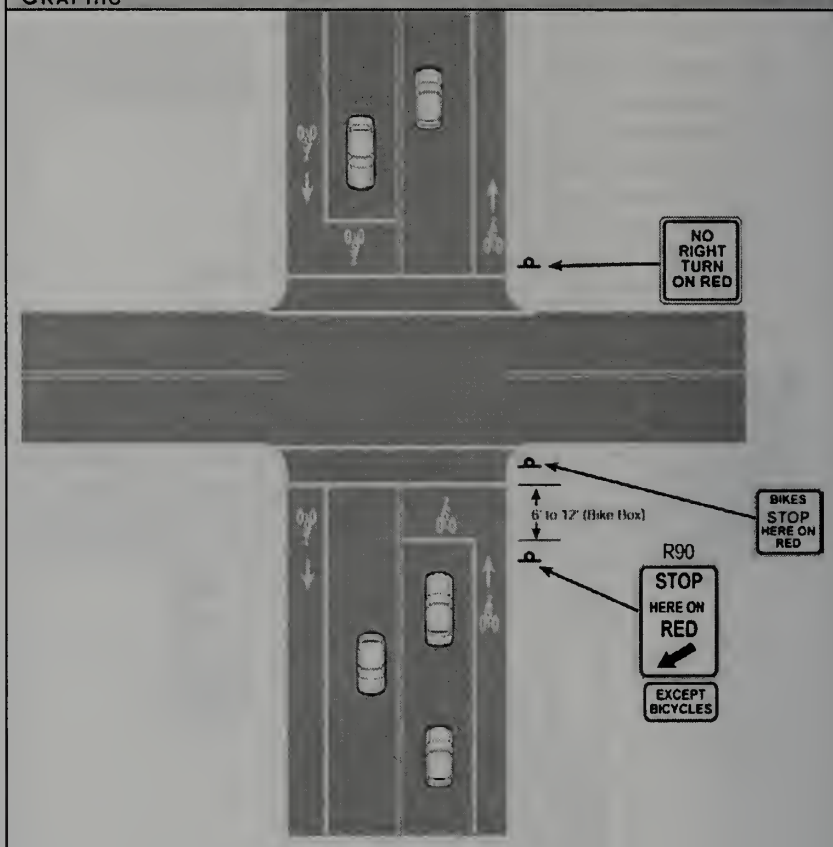
DESCRIPTION

This treatment includes a bicycle lane leading to a "box" situated behind the crosswalk and in front of the motor vehicle stop bar. The bike box allows bicyclists to move to the front of the queue and position themselves for turning movements. The treatment also improves the visibility of bicyclists. A bicycle marking is stenciled in the box and should be accompanied by signs communicating where bicycles and motor vehicles should stop.

POTENTIAL APPLICATIONS

- At intersections with a high volume of bicycles and motor vehicles
- Where there are frequent turning conflicts and/or intersections with a high percentage of turning movements by both bicyclists and motorists
- No right turn on red
- Can be combined with a bicycle signal (optional)

GRAPHIC



NOTES

All signage is presented as a starting point for development of a final design. Signs shown may or may not be included in a final facility design. Signage for this facility type should be consistent citywide. Use of double-wide stop bars should be considered prior to installation of additional signage.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Eugene, OR
- Portland, OR
- Cambridge, MA

7. LEFT-SIDE BIKE LANE ON ONE-WAY STREET WITH STREAMING BIKE LANE (BIKE BOX)

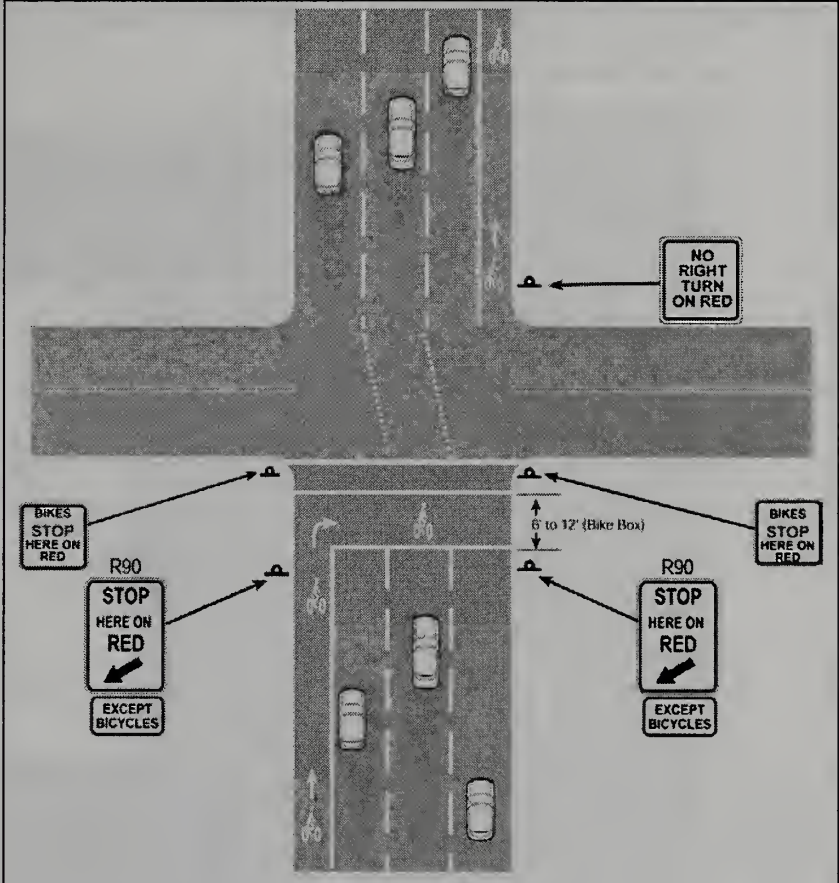
DESCRIPTION

This treatment provides a way to transition from a left side bike lane to a right side bike lane through the use of a bike box at an intersection. The bike box also allows cyclists to position themselves in front of stopped automobile traffic. The use of a bike box may be coupled with a countdown signal to inform cyclists (and pedestrians) of the available signal time to cross the street.

POTENTIAL APPLICATIONS

- Provides connection to a path or other bikeway facility
- Decreases conflicts with bus stops or highway ramps
- Where use does not interfere with near-side bus stops.
- Transition back to right-side bike lane can be made, if necessary
- Signal progression should be noted along street. If signal progression may lead to cyclists traveling perpendicular to traffic arriving at green light, reconsider bike box, or use traffic control for bikes traveling perpendicular in box, such as a bike signal
- Use with countdown signal to indicate time remaining for crossing in the bike box.

GRAPHIC



NOTES

All signage is presented as a starting point for development of a final design. Signs shown may or may not be included in a final facility design. Signage for this facility type should be consistent citywide. Use of double-wide stop bars should be considered prior to installation of additional signage.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Eugene, OR
- Cambridge, MA
- European cities

8. LEFT-SIDE BIKE LANE ON ONE-WAY STREET: TWO BIKE LANE TRANSITION OPTION

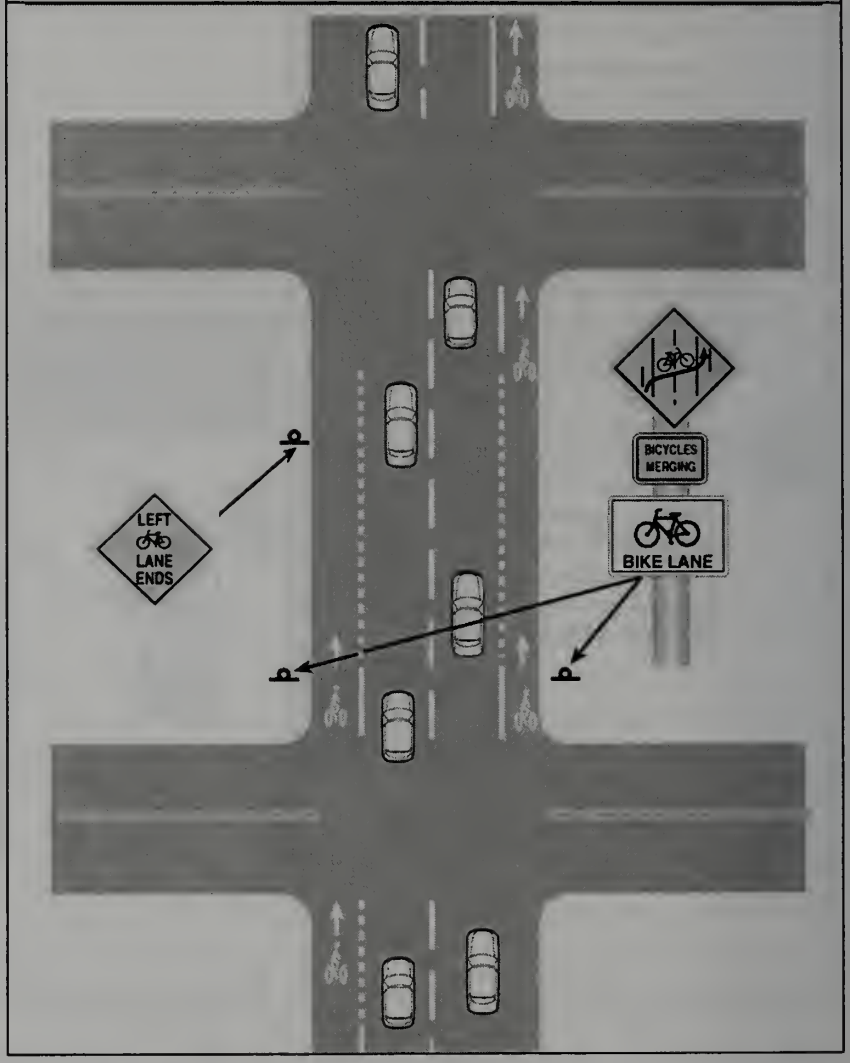
DESCRIPTION

This design provides two bike lanes on a one-way road as a way to transition from a left-side bike lane to a right-side bike lane.

POTENTIAL APPLICATIONS

- Provides connection to a path or other bikeway facility
- Decreases conflicts with bus stops or highway ramps
- Transition back to right-side bike lane can be made, if necessary

GRAPHIC



NOTES

Use of pavement messages in the left side bike lane (such as "BIKE LANE ENDS") or motor vehicle lanes (such as "BIKE MERGE AHEAD") may be appropriate.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Portland, OR

9. BIKE LANE WITH PARKING: DIAGONAL STRIPING BUFFER

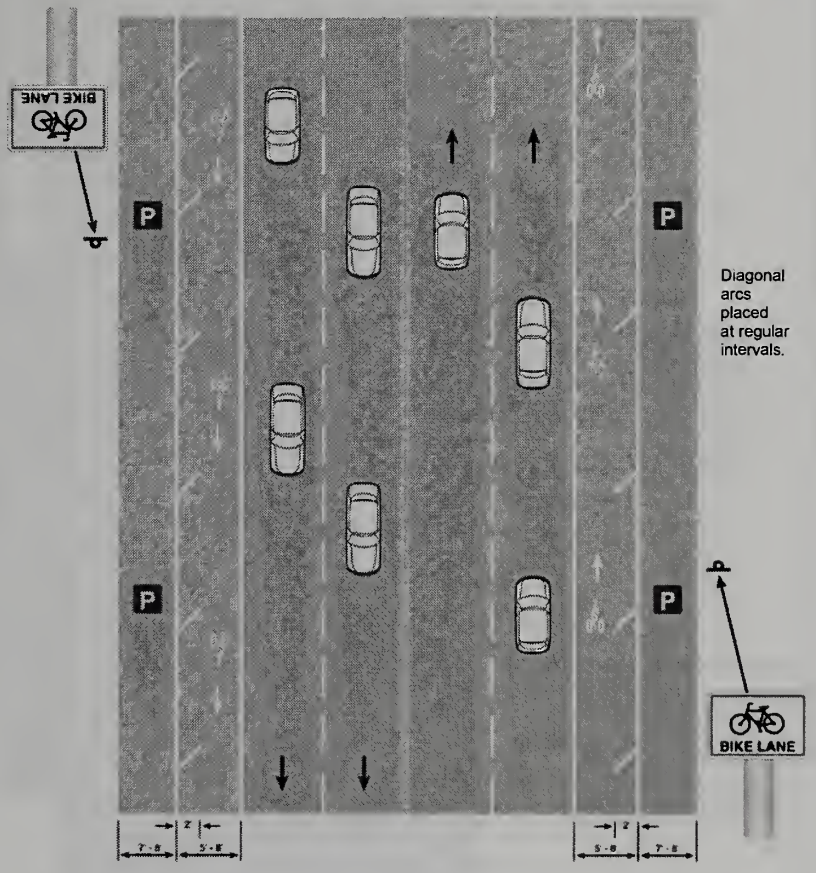
DESCRIPTION

A diagonal striping buffer could be used to indicate an area of concern for bicyclists due to the opening of car doors.

POTENTIAL APPLICATIONS

- Bike lane adjacent to on-street parking, especially with high turnover
- Bicyclists riding in "door zone".

GRAPHIC



NOTES

This treatment has not been tested for its effectiveness. A before and after study is recommended before wide spread application of this treatment is recommended. In areas demarcated with parking T's, simply extending the stem of the T may discourage cyclists from riding the door zone. This treatment should be studied.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Minneapolis, MN

10. ONE-WAY BIKE PATH (PHYSICALLY-SEPARATED LANE)

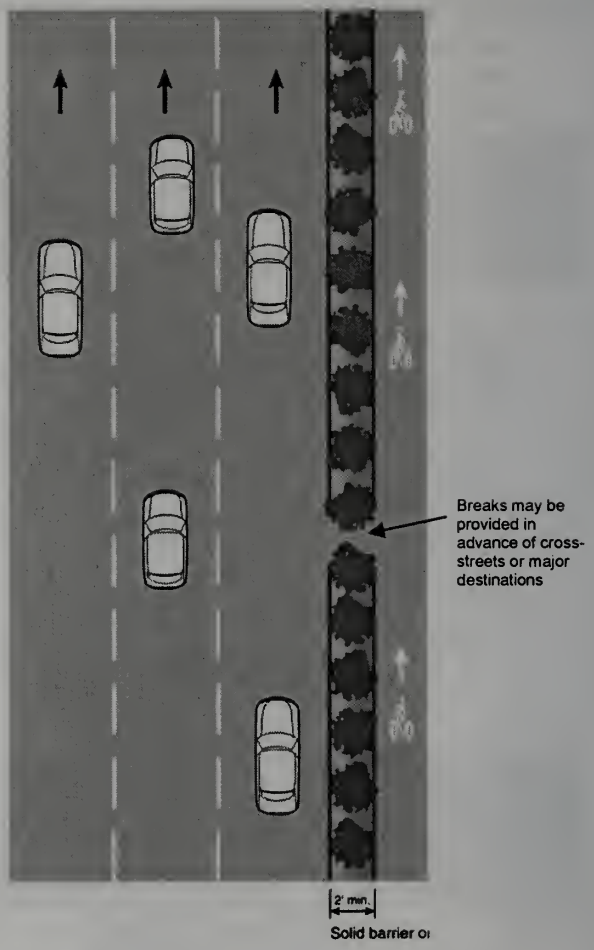
DESCRIPTION

The treatment provides a physical barrier between bikes and cars. It is useful along streets with minimal crossings. Installation of a one-way bike path should be undertaken only after careful consideration due to the problems of enforcing one-way operation and the difficulties in maintaining a path of restricted width

POTENTIAL APPLICATIONS

- When adequate pedestrian facilities exist so that the bike facility will not be considered a "multi-use path"
- Relatively few driveways or intersections
- Provides connection between two shared use path facilities
- Intersection transitions can be made
- Moderate to high speeds
- Regular street sweeping of track is possible
- There is an equivalent bikeway for the opposite direction that will be more attractive for cyclists in lieu of riding the wrong way on the track
- Where path does not interfere with transit stops

GRAPHIC



NOTES

On some routes, it may be appropriate to use soft hit posts or other means of physical separation 40 inches in height. However, Caltrans Chapter 1000 prohibits use of raised pavement markers to delineate bike lanes. There must be an equivalent bikeway for the opposite direction of travel that will be more attractive to bicyclists than riding the wrong way in the one-direction cycle track.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- European Cities
- Quintana Roo, Mexico

11A. COMBINED PARKING LANE AND BIKE LANE (FLOATING BIKE LANE WITH STRIPING)

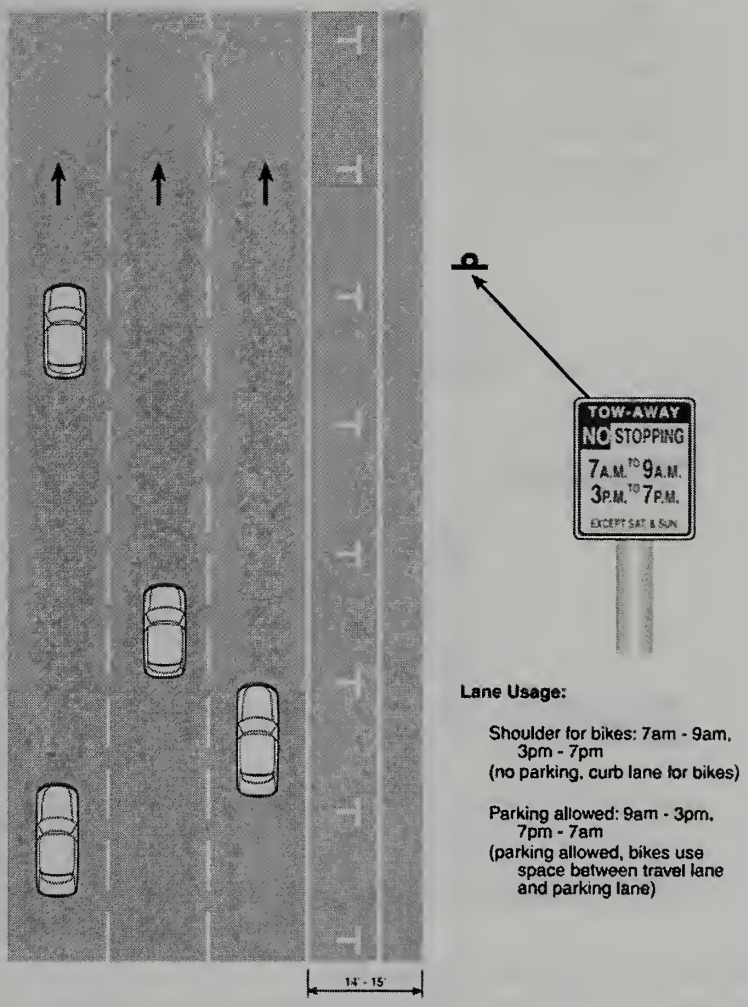
DESCRIPTION

This treatment designates a single lane to function as a parking lane, a designated bike route, and then both, depending on the time of day. During peak commute times when parking is not allowed, cyclists will use the shoulder. During off-peak hours when parking is allowed, bicyclists can use the space between the remaining automobile travel lanes and the parking lane.

POTENTIAL APPLICATIONS

- Primary bicycle commute routes
- Not enough width to provide standard bike lane and parking

GRAPHIC


P
TOW-AWAY
NO STOPPING
7A.M. TO 9A.M.
3P.M. TO 7P.M.
EXCEPT SAT & SUN
14' - 15'
Lane Usage:
Shoulder for bikes: 7am - 9am, 3pm - 7pm
(no parking, curb lane for bikes)
Parking allowed: 9am - 3pm, 7pm - 7am
(parking allowed, bikes use space between travel lane and parking lane)

NOTES

Beginning of each block must be cross hatched appropriately to prohibit parking in this location. This cross hatching treatment is used on The Embarcadero. Various treatments can be implemented as necessary, such as: cross hatching at beginning of facility, wider lane lines, marge signs, and longer parking T's to discourage use of lane by motor vehicles during off-peak hours.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- San Francisco, CA (The Embarcadero)

11B. COMBINED PARKING LANE AND BIKE LANE (USING SHARED ARROW)

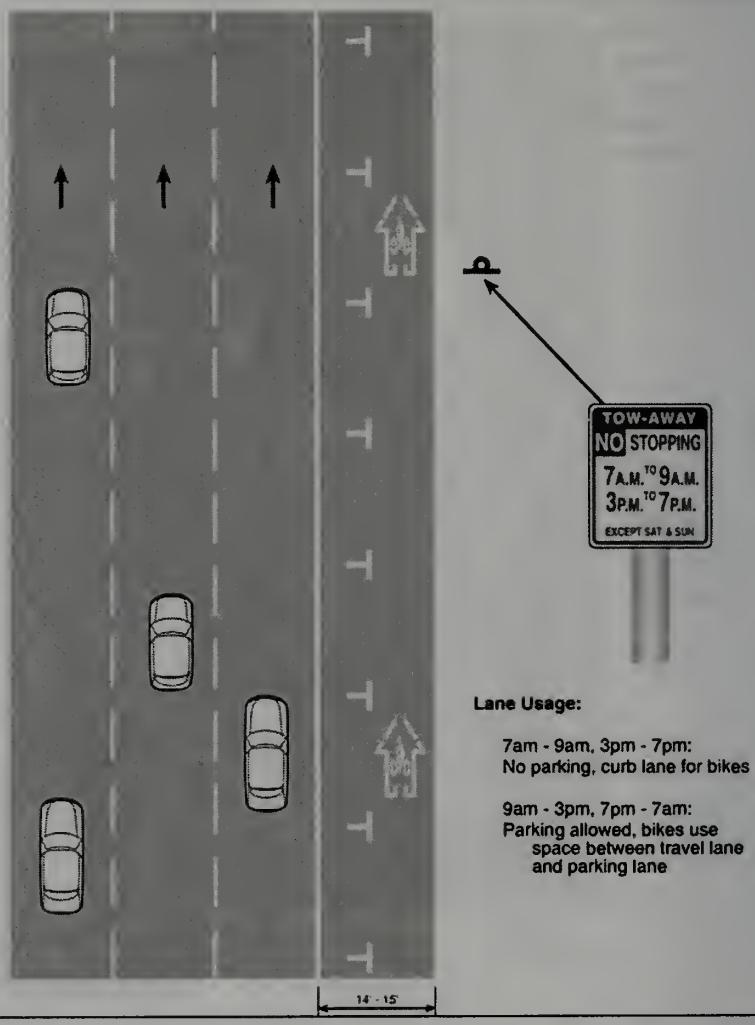
DESCRIPTION

This treatment designates a single lane to function as a parking lane, a designated bike route, and then both, depending on the time of day. The difference is that the "shared arrow" marking is used in lieu of striping.

POTENTIAL APPLICATIONS

- Primary bicycle commute routes
- Not enough width to provide standard bike lane and parking

GRAPHIC


TOW-AWAY
NO STOPPING
7A.M. TO 9A.M.
3P.M. TO 7P.M.
EXCEPT SAT & SUN
14' - 15'
Lane Usage:
7am - 9am, 3pm - 7pm:
No parking, curb lane for bikes
9am - 3pm, 7pm - 7am:
Parking allowed, bikes use space between travel lane and parking lane

NOTES

"Shared Use Arrow" and "Chevron" stencil symbols are being evaluated for this application.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- None known

12. BICYCLE BOULEVARD

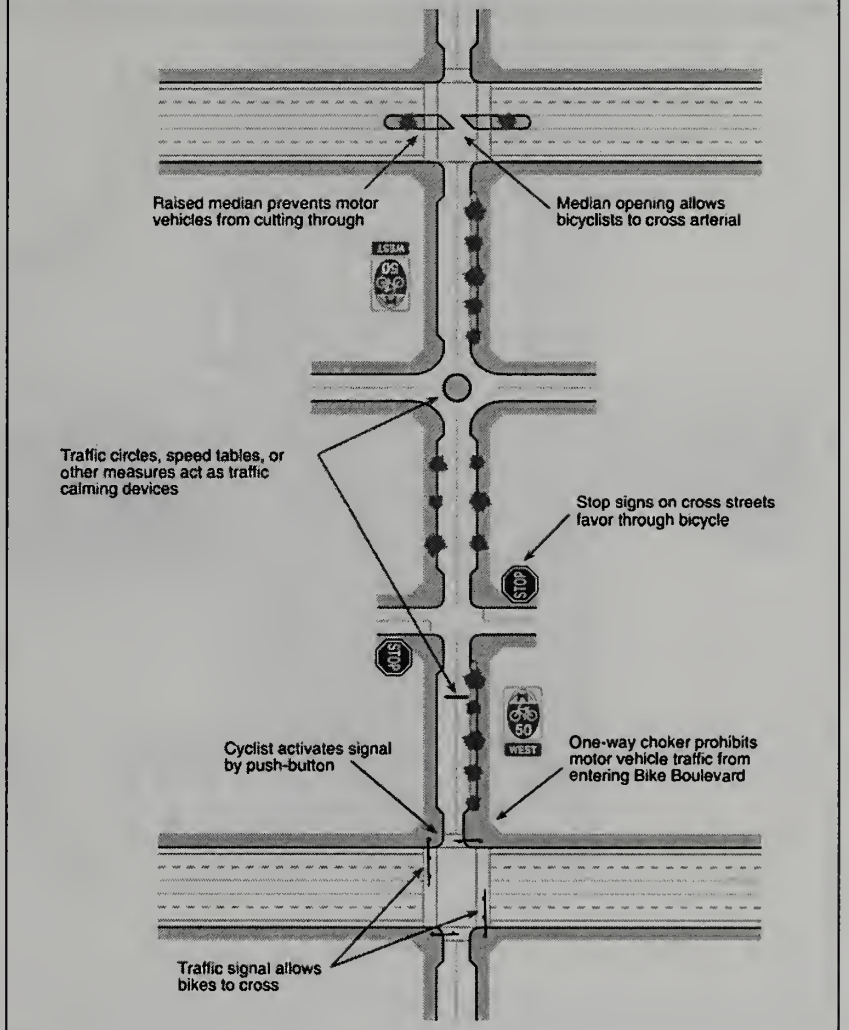
DESCRIPTION

The bicycle boulevard treatment is typically a lower volume street with traffic calming treatments that parallels a higher volume arterial. Traffic calming typically includes a set of improvements to slow traffic and prevent cut-through traffic such as: traffic circles, chokers, and medians. In addition, stop signs favor bicyclists by stopping perpendicular traffic. Push-buttons activate traffic signals to allow safe crossings of higher volume roadways.

POTENTIAL APPLICATIONS

- Low volume streets
- Calming traffic on streets within 1/4 mile of parallel arterials
- Allows access to key destinations
- Provides safe arterial street crossing

GRAPHIC


Raised median prevents motor vehicles from cutting through
Median opening allows bicyclists to cross arterial
Traffic circles, speed tables, or other measures act as traffic calming devices
Stop signs on cross streets favor through bicycle
Cyclist activates signal by push-button
One-way choker prohibits motor vehicle traffic from entering Bike Boulevard
Traffic signal allows bikes to cross

NOTES

20 mph speed limits should be considered.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Portland, OR
- Palo Alto, CA
- Berkeley, CA
- Vancouver, BC

13. CLASS I PATH CROSSING OF ROADWAY

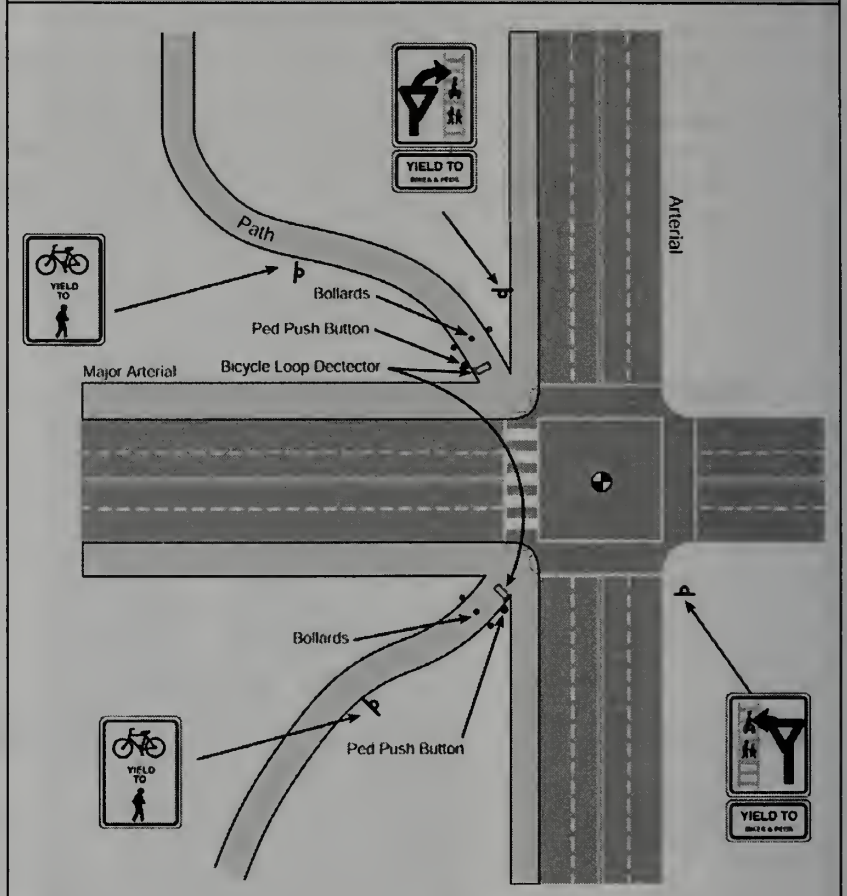
DESCRIPTION

This treatment provides a design for locations where Class I off-street paths cross roadways. Bollards and path geometry could be used to slow path users as they approach the intersection, however the use of bollards should only be used with prudence and where motorized vehicles may attempt to drive on paths.

POTENTIAL APPLICATIONS

- Intersections of Class I paths and high volume and/or high speed roadways
- Can also be used at a signalized mid-block crossing with median

GRAPHIC



NOTES

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Throughout the United States

14A. BIKE-ONLY LEFT-TURN POCKETS: SCENARIO 1

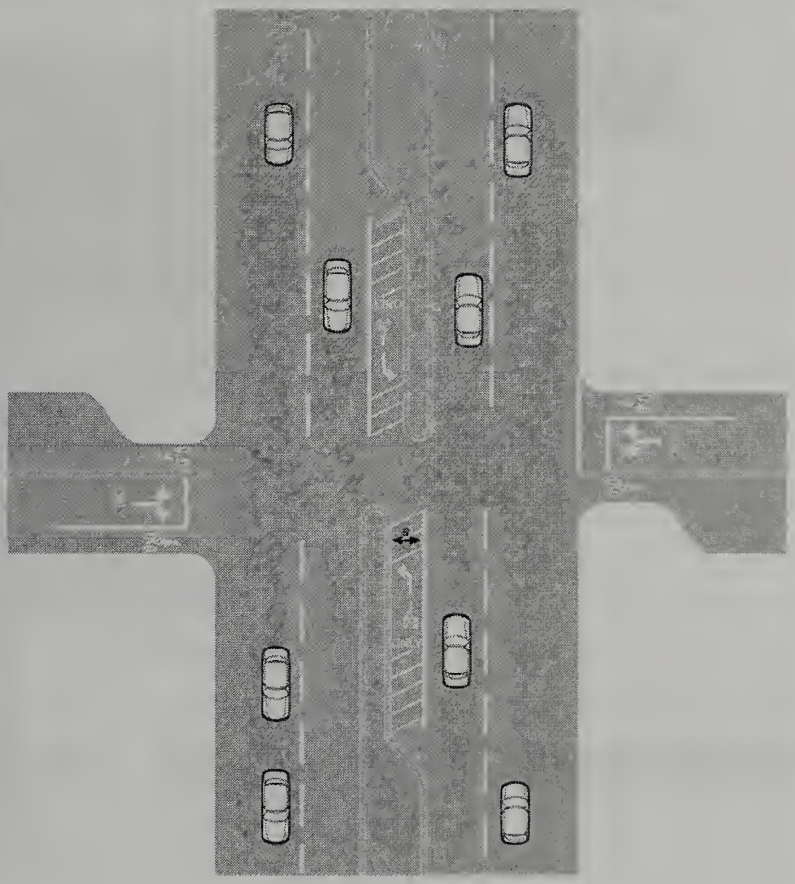
DESCRIPTION

A left-turn pocket allows only bicycles to access a bicycle boulevard or designated bicycle route. The intersection is controlled and the left-turn pocket may have a left arrow signal, depending on bicycle and vehicle volumes. Signs should be provided that prohibit motorists from turning, while allowing access to bicyclists. Bicycle signal heads may also be used.

POTENTIAL APPLICATIONS

- Motor vehicle movement prohibited
- Low-speed roadway
- On lower volume arterials and collectors

GRAPHIC



NOTES

Proper signage must accompany this treatment

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Portland, OR

14B. BIKE-ONLY LEFT-TURN POCKETS: SCENARIO 2

DESCRIPTION

This treatment shows a standard-width bicycle lane adjacent to the left-hand turn lane in order to reduce conflicts with turning vehicles.

POTENTIAL APPLICATIONS

- Low-moderate speeds
- On lower volume arterials and collectors
- Heavy vehicular left-hand turning movements

GRAPHIC

NOTES

The Bicyclists Merging sign may be placed on the right side of the road before the left-side turn pocket.

SELECTED LOCATIONS WHERE TREATMENT IS USED

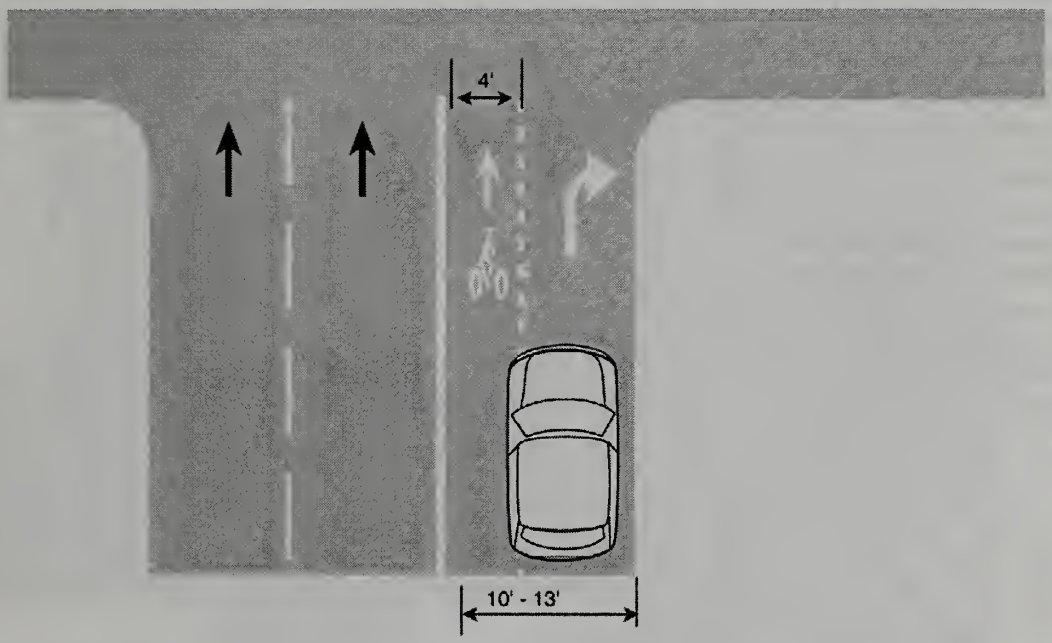
- San Francisco, CA (7th St at 16th St)
- Flagstaff, AZ

15. SHARED BICYCLE/ RIGHT-TURN POCKET

DESCRIPTION

This treatment places a standard-width bicycle lane on the left side of a dedicated right-hand turn lane when there isn't enough room for both. A dashed stripe delineates the space for bicyclists and motorists within the right-hand turn lane. Signs should be installed to instruct bicyclists and motorists of the usage of this facility.

GRAPHIC



POTENTIAL APPLICATIONS

- On roadways where there is not enough space to implement a standard-width bicycle lane and a standard-width dedicated right-turn lane at the intersection
- Low speed roadways
- Low volume of heavy vehicle traffic (or those needing a large turning radius)

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Eugene, OR
- Maui, HI

NOTES

Shared-Lane Arrow placed at outside turn lane may prove to be more appropriate marking for this treatment.

16. BIKE LANE THROUGH A COMPLEX INTERSECTION

DESCRIPTION

This treatment uses dashed markings to guide bicyclists and motorists through complex and/or confusing intersections. It also provides a benefit by making the bicycle network visible to travelers on perpendicular streets

POTENTIAL APPLICATIONS

- Where intersections are offset by about 7' to 30'
- Where there are more than four intersection legs
- There is a need to assist vehicle through an intersection.
- Where there are significant grades, especially where visibility is compromised
- In large, wide intersections
- At intersections with especially high bicycle cross-traffic

GRAPHIC

NOTES

This treatment may be perceived as guidance for bicycles, however it is helpful for all users of the roadway. The HDM does not recommend striping bike lanes through intersections. The HDM does allow "Detail 40" guidelines to aid road users. This is the approach that San Francisco has applied.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Paris, France

17. BIKE LANES ADJACENT TO BACK-IN DIAGONAL PARKING

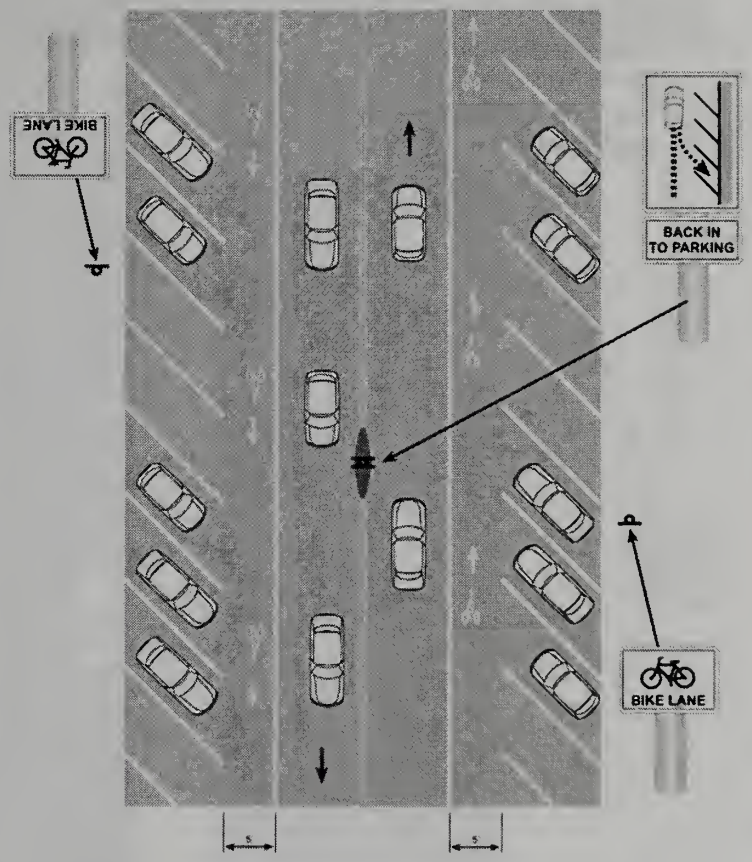
DESCRIPTION

Vehicular movements in and out of diagonal parking presents hazards to bicyclists. For this reason, it is recommended to avoid diagonal parking configurations adjacent to bike routes. At locations where diagonal parking is absolutely necessary, back-in parking should be used. This requires drivers to pull in front of a vacant space and reverse into the parking space. This forces the drivers to look behind them before crossing the path of oncoming bicyclists, and improves motorists' sightlines of oncoming bicycle and motor traffic while exiting.

POTENTIAL APPLICATIONS

- Use where diagonal parking is necessary

GRAPHIC



NOTES

Specific language for signage associated with this treatment will be evaluated as a part of implementation design. Language used by Pottstown, PA (Philadelphia) reads "BACK IN ANGLE PARKING ONLY" behind every third stall. Parking stall widths wider than normal may be needed to accommodate drivers unfamiliar with back in parking. A City ordinance change may be required to specify back in angle parking to create a legal basis for this configuration.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- Seattle, WA

18. SHARED-LANE ARROW MARKING

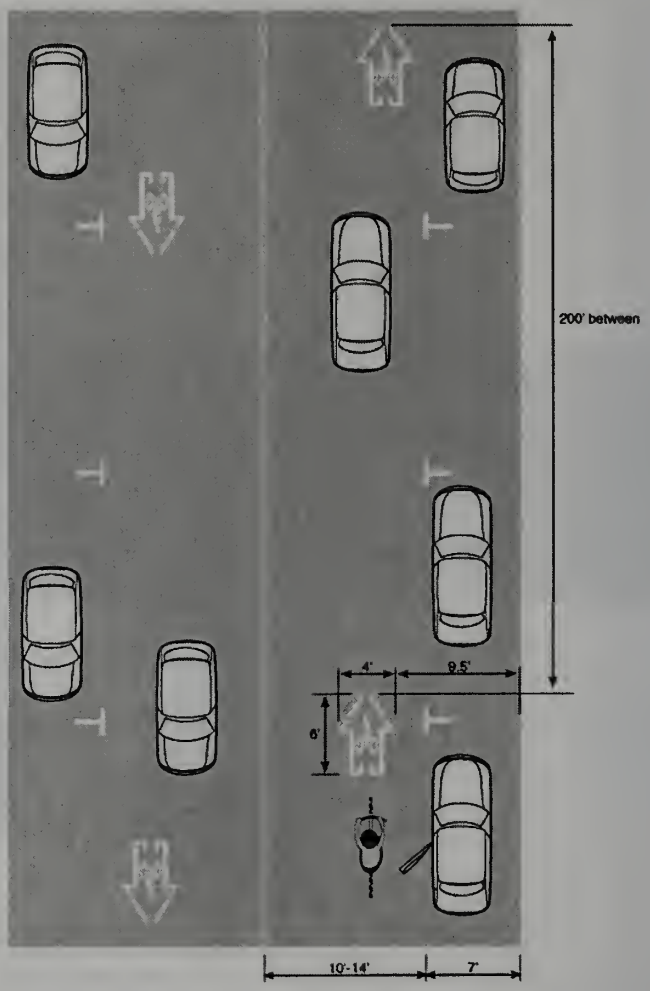
DESCRIPTION

The primary purpose of this measure is to provide positional guidance to bicyclists on roadways (that are too narrow to be striped with bike lanes). Markings may be placed on the street to inform motorists about the presence of cyclists, and also to inform cyclists how to position themselves with respect to parked cars and the travel lane. The design, placement, and effectiveness of the marking is currently being studied by the City of San Francisco.

POTENTIAL APPLICATIONS

- Roadways that are too narrow for standard striped bike lanes
- Areas that experience a high level of "wrong-way" riding
- Areas with moderate to high parking turnover

GRAPHIC



NOTES

At the time of writing, this marking treatment was being studied for effectiveness by the City of San Francisco. The exact design for the marking and other details such as placement and spacing will be determined after the study is completed.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- San Francisco
- Denver, CO
- Paris, France
- Gainesville, FL

19A. DOUBLE TURN LANES: SHARED LANE

DESCRIPTION

The use of double-turn lanes should be discouraged because of the difficulties they present for pedestrians and bicyclists. Existing double-turn lanes should be studied and converted to single-turn lanes, unless found to be absolutely necessary for traffic operations. In situations where the double-turn lane cannot be avoided, the following design can be used to safely accommodate bicyclists. This design uses the shared arrow stencil to indicate that bicyclists and automobiles are to share the through/turn lane. This properly positions through bicyclists and reduces conflicts with right turning vehicles.

POTENTIAL APPLICATIONS

- In double right turn situations with a right-turn lane and a through/turn lane.

GRAPHIC

NOTES

SELECTED LOCATIONS WHERE TREATMENT IS USED

- San Francisco, CA

19B. DOUBLE TURN LANES: "GHOST" BIKE LANE

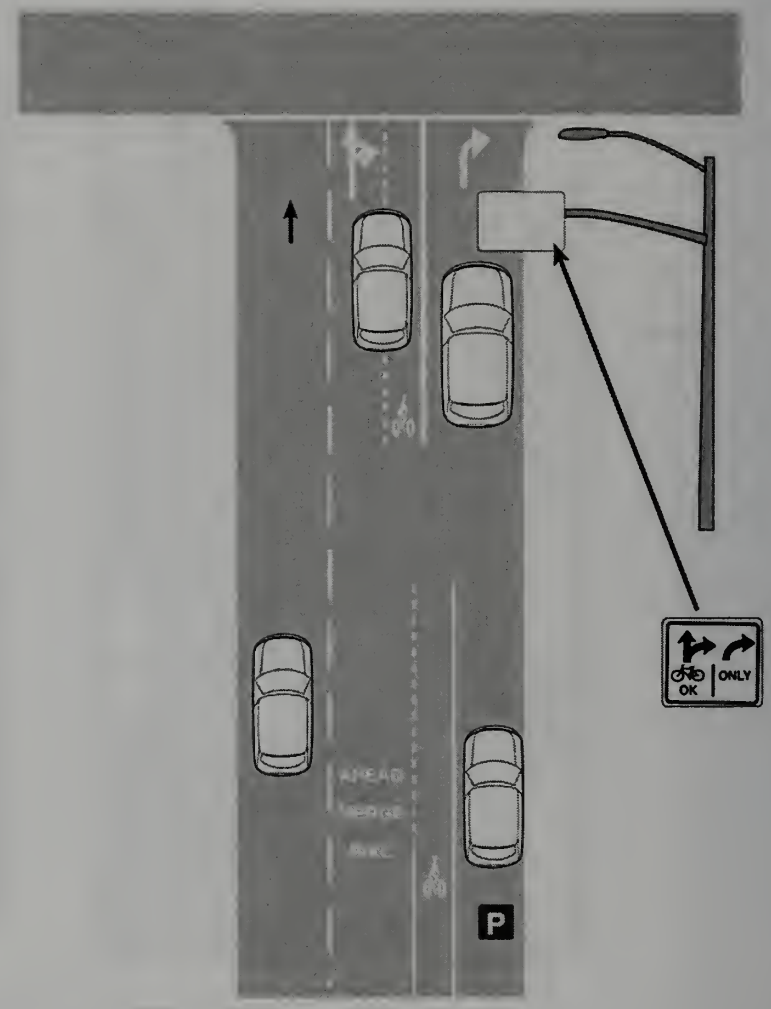
DESCRIPTION

The use of double-turn lanes should be discouraged because of the difficulties they present for pedestrians and bicyclists. Existing double-turn lanes should be studied and converted to single-turn lanes, unless found to be absolutely necessary for traffic operations. In situations where the double-turn lane cannot be avoided, the following design can be used to safely accommodate bicyclists. This design positions bicyclists in the through/turn lane while giving more clear delineation of safe travel path than the "shared lane" approach. The bicyclist therefore "blocks" the motorists in this travel lane.

POTENTIAL APPLICATIONS

- In double right turn situations with a right-turn lane and a through/turn lane, where a double-right turn is absolutely necessary for traffic operations

GRAPHIC



NOTES

Shared-Lane Arrow placed at center of through/turn lane may prove to be more appropriate marking for this treatment, as shown in 19A. Motorist understanding of the shared lane marking requires study. Inclusion of bike box in front of through/turn lane should be considered.

SELECTED LOCATIONS WHERE TREATMENT IS USED

- None known

20. SUPPLEMENTAL BICYCLE FACILITY SIGNS AND SIGNALS

DESCRIPTION

The following sign designs may be used in connection with the treatments listed in this guide or at locations with standard bike facilities that would benefit from their installation. This listing is meant to supplement the signs listed in the Manual of Uniform Traffic Control Devices (MUTCD) and the Caltrans Traffic Manual. While signs help to inform behavior, it is important to select signage carefully. Overuse of signage can lead to visual clutter which in turn, lessens the effectiveness of the signs and decreases the aesthetic quality of the street.

NON MUTCD SIGNS, CALIFORNIA STANDARDS

The following signs do not conform to MUTCD standards, but are currently approved for use in California and are used in San Francisco.

Local Bicycle Route Sign:
Street signs with a green bridge icon indicate local bicycle routes.

Cross Town Bicycle Route Sign: Street signs with a red bridge icon indicate cross-town routes

Bicycle Route Detour Sign: Street signs with a black background and orange foreground indicate detoured bicycle routes.

This bicycle-specific signal head may be used as per the standards set by CTCDC, 11/19/99. The signal provides a separate phase specifically for bicyclists.

This sign may be used to warn bicyclists and motorcyclists of track crossings.

NON STANDARD SIGNS CURRENTLY IN USE IN SAN FRANCISCO

The following non standard signs are currently used in San Francisco.

Bicycles Allowed Use of Full Lane Sign: Indicates bicycles allowed full use of lane in situations where no bicycle lanes exist or where merging with vehicle traffic is required for safe operations.

Trucks Make Wide Turns Sign: Indicates to bicyclists and motorists that large trucks will swing left prior to making right turn. Sign warns bicyclists of potential right-side conflicts.

This sign may be used at an intersection with double turn lanes.

This sign may be used to indicate an alternative route for bicyclists.

Custom made placards such as this may be used to address unique lane positioning situations for bicyclists.

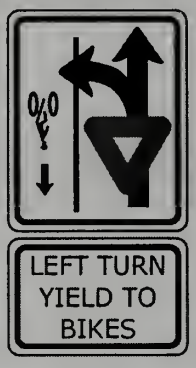
This sign may be used to discourage motorists from parking in bike lanes.

This sign may be used to direct bicyclists to bike parking.

NON STANDARD SIGNS TO BE CONSIDERED FOR USE IN SAN FRANCISCO

The following non standard signs should be considered for use in San Francisco.

This sign may be used to indicate bike lane transitions or other locations where bicyclists may be merging.



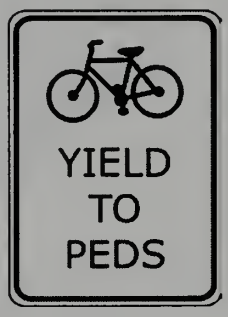
This sign may be used on a contra-flow lane treatment.

This sign may be used where a travel lane crosses a colored-lane treatment

This sign may be used on a contra-flow lane treatment.

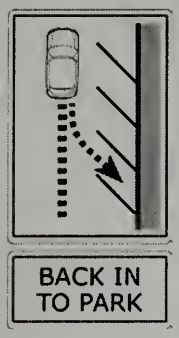
This sign may be used to indicate the ending of a bike lane where bicyclists need to merge.

This sign may be used at multi-use path-roadway crossings. Sign should face motorists.



This sign may be used on Class I multi-use paths.

This sign may be used where bicyclists must use a pedestrian signal to cross an intersection.



This sign may be used to indicate areas of back-in angled parking.

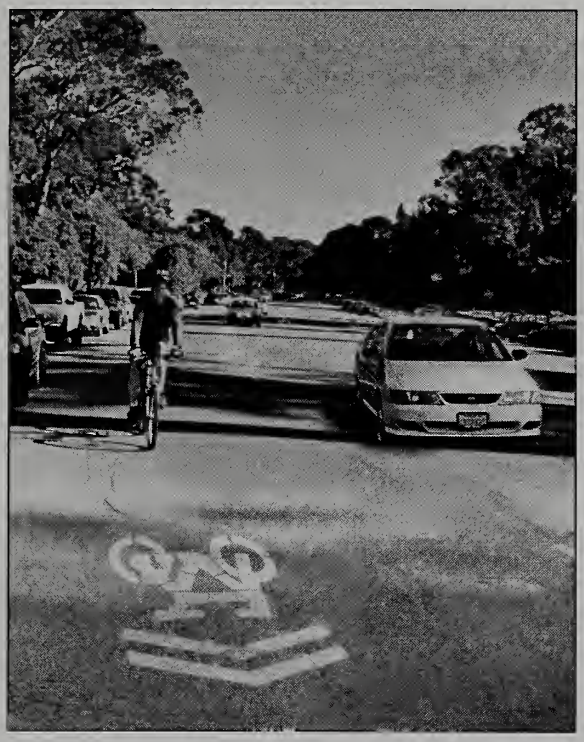
This sign may be used to warn motorists of the presence of bicyclists.

This sign may be used to warn motorists of the presence of bicyclists.

This sign may be used to warn motorists of the presence of bicyclists.

APPENDIX B. SHARED USE PAVEMENT ARROW STUDY

San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety



FINAL REPORT
February 2004

Prepared for:

SAN FRANCISCO DPT DEPARTMENT OF PARKING & TRAFFIC

San Francisco Department of Parking & Traffic

Prepared by:

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Project Need

Traffic curb lanes on signed/shared Class III bikeways (a.k.a. "signed shared roadways" in other states) are often too narrow to be safely shared side-by-side by cyclists and passing motorists. On these routes, cyclists wishing to stay out of the way of drivers often ride too close to parked cars and risk being struck by a suddenly opened car door (being "doored"). To avoid this, experienced cyclists ride further to the left and position themselves closer to the center of narrow lanes. This is permitted by the California Vehicle Code (C.V.C. 21202), but it often irritates motorists who are not aware that this is permitted. To address this and other problems, the San Francisco Bicycle Plan recommends that Class III bike routes be delineated with on-road markings. However, no approved standard pavement marking exists for this purpose. As a result, the following problems have arisen, particularly on higher traffic volume roadways:

- High incidence of "dooring",
- Wrong-way riding,
- Sidewalk riding, and
- Motorist squeezing cyclists against the curb or parked cars, or exhibiting other aggressive behaviors.

Paris, France

Many cities have experimented with a "shared lane marking" as a potential solution. The marking does not connote a separated bicycle lane, but instead directs the bicyclist to travel outside the car door zone and encourage safe co-existence. Such cities include Denver (CO), Gainesville (FL), Cambridge (MA), Portland (OR), Oakland (CA), Paris (France), Brisbane (Australia), Zurich (Switzerland), Buenos Aires (Argentina) and others (see Appendix A for details of these and other efforts.) The only city to study the effectiveness of such markings is Gainesville (FL), which found that the markings caused cyclists to shift their positions by a few inches, a positive result.

Denver, Colorado

The City and County of San Francisco has in particular experienced a high frequency of complaints and problems due to increasing volumes of bicyclists on streets with high traffic volumes and heavily-used on-street parking. In 1998, San Francisco began experimenting with a green* pavement marking, referred to as "bike-in-house," similar to that of Denver (CO), on various streets. While cyclist feedback was generally positive, there was concern about the marking's low visibility. As other jurisdictions began using varying marking designs, questions also arose about the need for a standard application of spacing, size, and location, as well as whether the marking was effective, safe, and beneficial.

Portland, Oregon

Thus, the San Francisco Department of Parking and Traffic (SF DPT) undertook this study to determine the effectiveness of shared lane pavement markings in encouraging safe bicyclist and motorist coexistence. The process ideally

* San Francisco used green as its marking color for the "bike-in-house" marking because it was not in use as a standard +color for on-street traffic control devices.

will lead the California Traffic Control Device Committee (CTCDC) to formally approve and effective shared lane marking for use throughout the state.

Goals

The purpose of this study is to determine the effectiveness of shared-lane markings in achieving three distinct goals.

Goal 1: Improve the position of both motorists and bicyclists on roadways without bicycle lanes

Measure of Effectiveness:

- Distance of bicyclist from adjacent parked cars.
- Distance of motorist when passing a bicyclist.

Note: All study streets had on-street parking; however, if there was no parked car at the study site the measurement was to the curb face.

Goal 2: Reduce aggressive motorist behavior

Measure of Effectiveness:

- Observable hostile behaviors such as honking, gestures or other behaviors when passing or waiting to pass a bicyclist.

Goal 3: Encourage correct bicyclist riding behavior

Measure of Effectiveness:

- Number of bicyclists riding on the sidewalk.
- Number of bicyclists riding wrong-way on the street.

Additional Objectives

Shared-lane markings may also have the following effects:

- Inform motorists to expect bicyclists on the roadway.
- Inform motorists that bicyclists may indeed legally ride further to the left in the travel lane, even if that means blocking the lane at times.
- Inform bicyclists how to position themselves in the lane with respect to the curb or parked cars to avoid hazards.
- Increase the number of cyclists as people may feel more comfortable riding on streets with markings.

Arrow Designs

Human Factors Survey: Findings

The marking design in other cities is quite varied, as seen in Appendix A. Recognizing that an infinite number of possible design variations exist (size, color, shape, etc.), SF DPT undertook a human factors survey of the three most commonly used marking designs in the U.S.. The study compared driver and bicyclist comprehension of three alternative designs for the shared-use marking. Staff presented 120 bicycling commuters and 120 motorist commuters with one of three photographs (Figure 1) showing a typical urban street with a different kind of shared lane marking. They then asked a series of open-ended questions to determine:

- What they felt they should do in that scenario if they were bicycling/driving,
- Why they would react that way, and
- What they thought the pavement marking in particular meant they should to do.

Key results included:

- All three markings encouraged motorists to be more aware of bicycles.
- The bike-and-separate-arrow marking frequently conveyed the incorrect message "bike straight only at the intersection ahead."
- The bike-and-chevron marking was more likely to elicit the response to slow down than the bike-in-house symbol.
- Significantly more respondents thought the bike-and-chevron marking indicated a shared use lane than the bike-and-separate-arrow marking.
- About half of the surveyed bicyclists thought they should stay in the right lane and follow the arrow.

Bike-and-chevron marking

Bike-and-separate-arrow marking

Bike-in-house marking

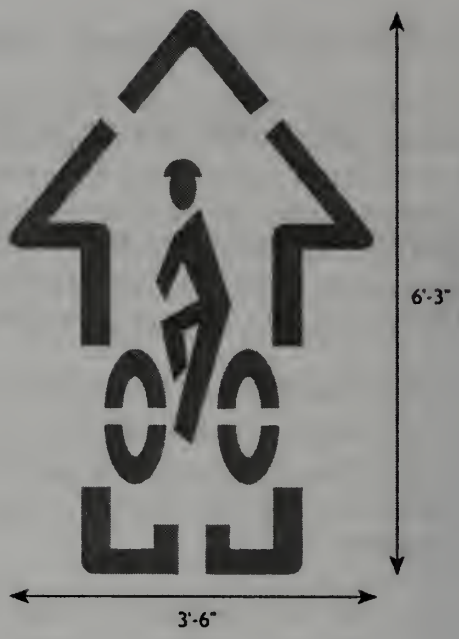
Figure 1. Survey Exhibits: Photographic Renderings

Selected Designs

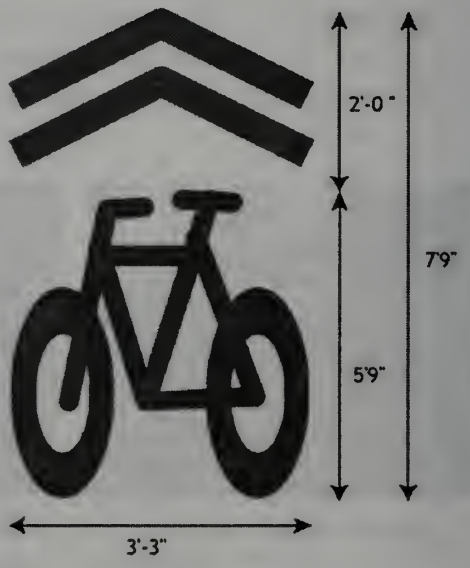
As a result of this research, as well as review from a Technical Advisory Committee, SF DPT chose to study the two designs shown in Figure 2.

The **modified bike-in-house** is 42 inches (3'-6") wide at the arrow points, 28 inches (2'-4") wide at the bottom channel, and 75 inches (6'-3") long. The rider is 28 inches wide at the wheels and 48 inches tall. Compared to the original bike-in-house used on various streets, the bicyclist is twice as large, the overall marking is 3 inches longer, and the overall width remains the same. In addition, a bike wheel channel was created at the bottom to encourage cyclists to ride on the arrow.

The **bike-and-chevron** marking is used in Paris and Chicago. Technical advisory committee members also strongly recommended studying the bike-and-chevron marking.



Modified "bike-in-house" marking



Bike-and-chevron marking

Figure 2. Selected Designs for the Study

Before-and-After Videotape Analysis

The primary approach used to evaluate cyclist and driver behavior was a before/after videotape study. In addition, the consultant team and the San Francisco Bicycle Coalition (SFBC) administered surveys to cyclists and drivers to gauge their perceptions about the effectiveness of the markings. This document presents the findings of both the video study and surveys.

The consultant team collected more than 140 hours of video, primarily during the weekday commute, at six locations (see photos starting on page 7):

- Polk Street
- 17th Street
- 2nd Street
- Market Street (weekday/midday location)
- JFK Drive (weekend/weekday location)
- Stanyan Street (weekend location)

The locations are heavily-used bicycle routes for both utilitarian and recreational cyclists. The streets have on-street parking with relatively narrow (≤22 feet) outside shared lanes (including parking) and no bicycle lanes. They have varied traffic volumes and roadway width characteristics (see Table 1). The markings were placed so that the centerline is 11 feet from the curb, or about 4 feet from parked cars (see Figure 3).

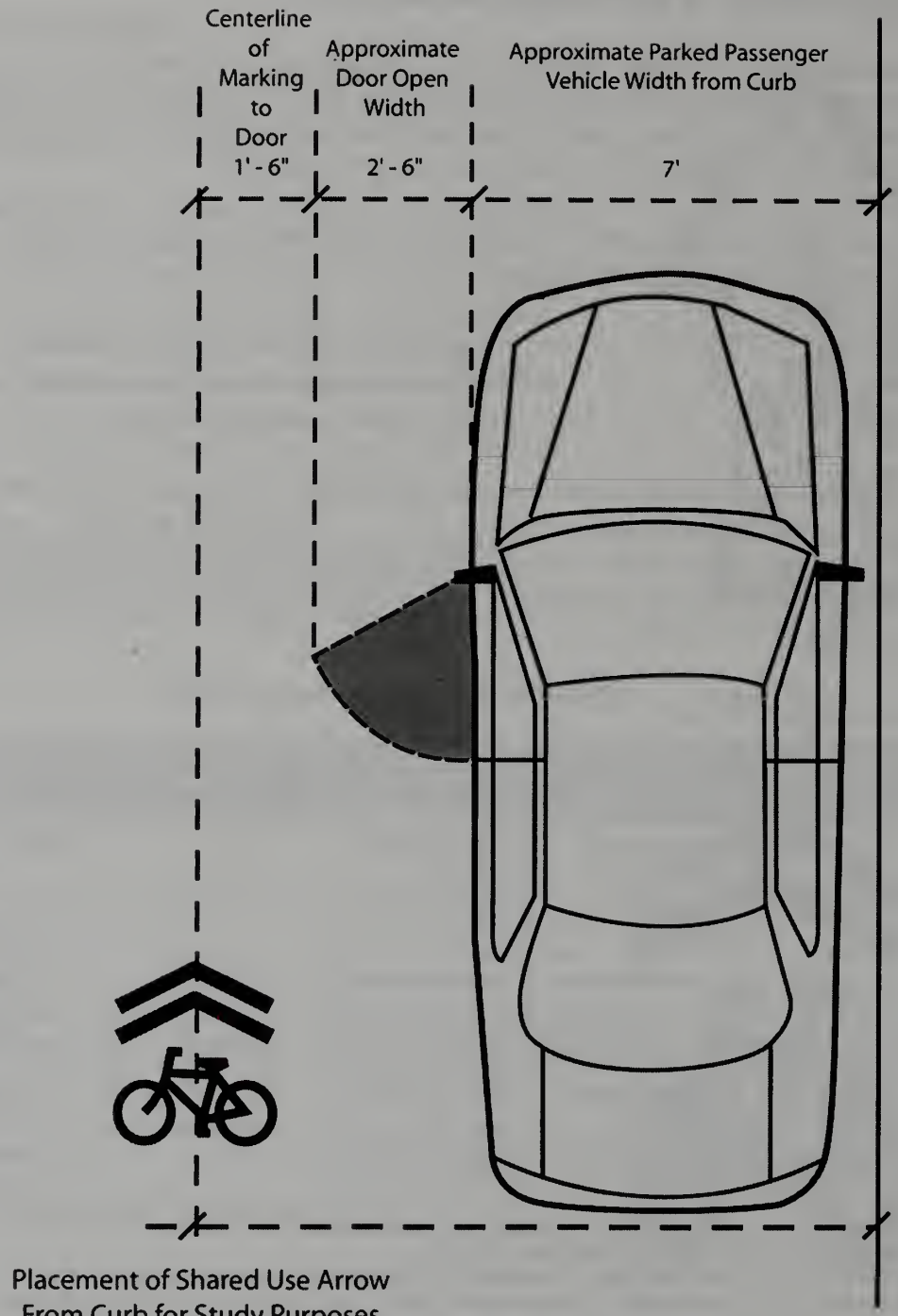
Table 1. Characteristics of Marking Locations

Street	Location	# of Lanes	Curb Lane Width (includes parking)	ADT[1] (Volume)
Polk Street	between Washington and Sacramento	two-lane road	22'	high ADT/lane
17th Street	between S. Van Ness and Dolores[2]	two-lane road	22'	moderate ADT/lane
Second Street	between Mission and Howard	four-lane road	17'	moderate ADT/lane
Market Street	between Van Ness and Octavia[2]	four-lane road	18' to 19'	high ADT/lane
JFK Drive	between 8th and 10th Ave.	four-lane road	17' to 19'	moderate ADT/lane
Stanyan Street	between Haight and Frederick	four-lane road	16'-10"	moderate ADT/lane

[1] Heavy ADT is defined as more than 4000 vehicles per day per lane of traffic. Moderate ADT is defined as between 2000 and 4000 vehicles per day per lane of traffic.

[2] 17th Street (between Dolores and Valencia) and Market Street (between Octavia and Gough) were marked by DPT with green pavement arrows years prior to the Before/After Study. These green test arrows were removed prior to the initiation of the "Before" video documentation.

Note: Other streets–Fell St., 8th Ave., Transverse St., Page St.–were considered but not selected for analysis as the budget allowed for only six streets. The selected streets offer a good range of comparable issues.


Centerline of Marking to Door 1' - 6"
Approximate Door Open Width 2' - 6"
Approximate Parked Passenger Vehicle Width from Curb 7'
Placement of Shared Use Arrow From Curb for Study Purposes 11'-0" *

* This placement is based on the following:
- 85th percentile of car doors observed opened to 9'6" from curb (per DPT field observations).
- Average width of bicycles is 2'.
- 6" clearance from door to bicycle handlebar is desired minimum "shy distance".

Figure 3. Plan View of Marking Placement

Locations of Study Markings

17th Street

eastbound

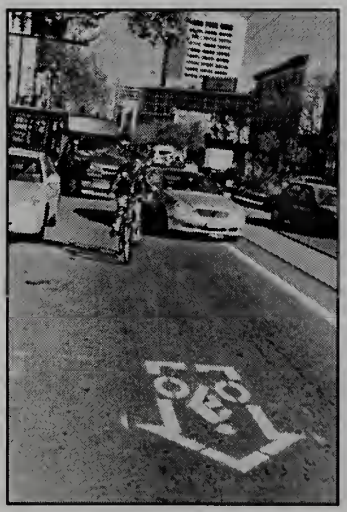
westbound

2nd Street

northbound

southbound

Market Street



westbound

eastbound

Polk Street

southbound

northbound

Stanyan Street

northbound

southbound

JFK Drive

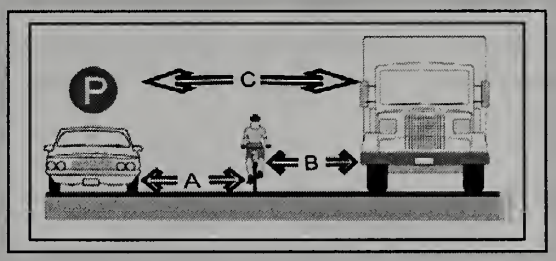
eastbound

westbound

Summary of Data Collection

Sample Size

- 6 locations
- 140 hours of videotaping
- "Before" study:
  - 1100 cyclists
  - 1000 motor vehicles
- "After" study:
  - 1300 cyclists
  - 1400 motor vehicles



Time of Study

- Spring-Summer 2003
- Various times during the day, depending on street

Variables Studied

- Number of travel lanes
- Traffic volume
- Curb lane width
- Location
- Time of day
- Marking type

Recorded Behaviors

- Cyclists' positions (A and B in the above diagram)
- Motorists' positions (B and C in the above diagram)
- Cyclist direction
- Cyclist location (street vs. sidewalk)
- Visible conflicts between cyclists and motorists

Note: Distances were measured to and from the tires of the car or bicycle. Based on review of the videotapes and the videographer's perceptions, the presence of the video camera did not seem to alter cyclists' or drivers' behaviors. However, the use of a video camera angled at oncoming cyclists did present a potential measurement error of up to 3 inches due to the inherent distortion of the view field. This measurement error could be eliminated in future studies through the use of an overhead-mounted camera or laser measurement device.

Results

Technical Results

Overall, the stencil markings significantly* improved both motorists' and cyclists' positions in the roadway (using the median average positions). The markings also reduced sidewalk and wrong-way riding.

Goal 1: Position of bicyclists and motorists

- Finding 1: Overall, the presence of a marking **increased the distance of cyclists to parked cars by 8 inches.** The effect of each marking on position was similar (see Figure 4).

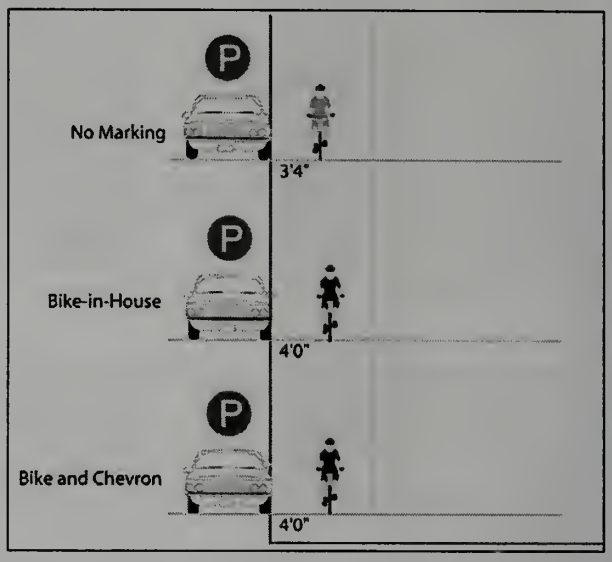


Figure 4. Effect on Bicycle to Parked Car Spacing

- Finding 2: When passing vehicles were present, the markings caused an **increase of 3 to 4 inches in the distance between cyclists and parked cars.** In addition, the markings caused an **increase of over 2 feet in the distance between cyclists and passing vehicles.** The bike-and-chevron had a greater effect (by 3 inches) on the distance between cyclists and passing vehicles (See Figure 5).

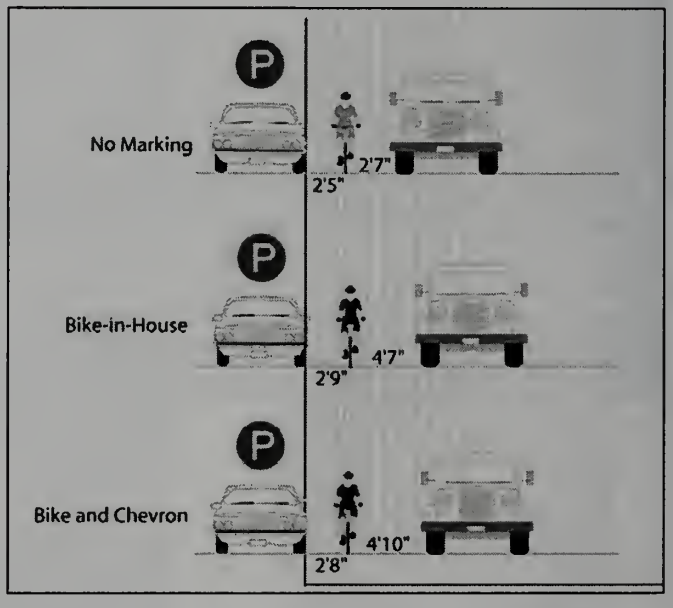


Figure 5. Effect on Motorist and Bicyclist Spacing

* The use of the term, "significant" means that the observed change was the result of a change in the variable (i.e., the pavement marking), as opposed to normal variance in the measurements. Significance has been determined through the use of a variety of statistical tests and tools including χ^2 (chi-squared) tests and multiple linear regression where appropriate. The χ^2 tests were used to compare the before/after results for behaviors such us cyclists' location and direction. Linear regression was used to analyze the measured results in relation to the markings.

(Goal 1 Continued)

- Finding 3: When no cyclists were present, both of the markings had a significant positive effect of about one foot on the distance between passing vehicles and parked cars (see Figure 6).

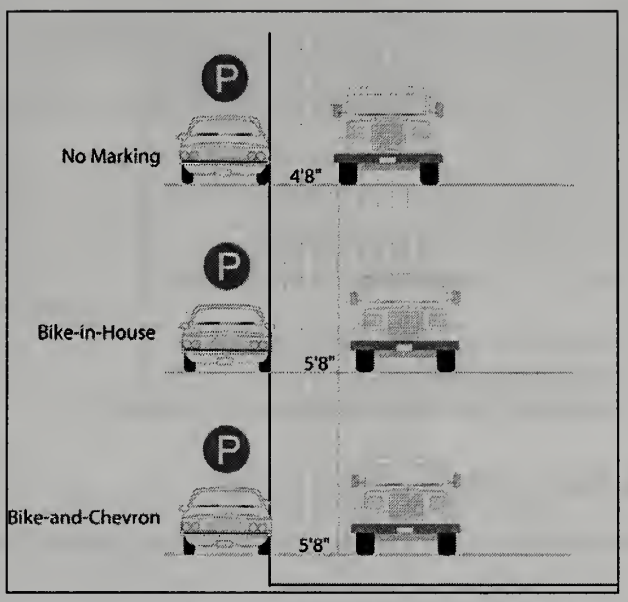


Figure 6. Effect on Motor Vehicle to Parked Car Spacing

Goal 2: Reduction in aggressive motorist behavior

- The markings neither significantly reduced nor increased the number of observable hostile behaviors between bicyclists and motorists. This was primarily due to the low number of aggressive behaviors recorded in the "before" videotapes.

Goal 3: Reduction in improper bicycle behavior

- Both the markings significantly reduced the number of sidewalk riders: the bike-and chevron by 35% and the bike-in house by 25%.
- The bike-and-chevron marking significantly reduced the number of wrong-way riders by 80%. The bike-in-house marking did not have any significant impact on the percentage of wrong-way riders.

Table 2 provides a summary of these findings. Complete results are on file with the San Francisco Department of Parking and Traffic's Bicycle Program.

Table 2. Summary of Bicyclists' and Motorists' Behavior

Behaviors	Before	After	
	(No marking) sample size=1158	Bike-in-House sample size=570	Bike-and-Chevron sample size=794
Sidewalk riders	6.5%	**4.9%**	**4.2%**
Wrong-way riders	3.0%	3.3%	**0.60%**
Hostile behaviors	0.15%	0.17%	0.12%
Distance of cyclists to parked cars	3'-4"	**4'-0"**	**4'-0"**
Distance of cyclists to cars in travel lanes	2'-7" sample size=150	**4'-7"** sample size=59	**4'-10"** sample size=150
Distance of cars in travel lane to parked cars (no bike present)	4'-8"	**5'-8"**	**5'-6"**

Significant differences are indicated in **boldface**.

Variables Influencing Results

Various factors contributed to these study results, including:

- Number of travel lanes
- Traffic volume
- Curb lane width
- Time of day (AM Peak/PM Peak/weekday midday/weekend)

Each variable was classified in two groups (such as high/low, narrow/wide, or AM/PM). The median and mean average distances were isolated and cross-tabulated for different factors and were compared to see if the variables had an effect on distances between cyclists, parked cars, and passing cars. Table 3 summarizes the characteristics' effects on cyclists and motorist positions. A complete listing of the cross-tabulated results is on file with the SF DPT Bicycle Program.

Table 3. With Markings in Place, Significant Street Characteristics Affecting Behavior

Factor	Effect on Distance between Bicyclists and Parked Cars	Effect on Distance between Bicyclists and Passing Vehicles
More lanes (4 vs. 2)	increase	decrease
Higher traffic volume	no effect	no effect
Wider curb lane	decrease	increase
AM vs. PM	no effect	no effect
Peak Periods	decrease	decrease

In comparing the effects of the markings on rider position on streets with different characteristics, the study found that:

- The markings have a **greater effect on distance** between cyclists and parked cars **on four lane roads** than on two lane roads.
- The markings have a **greater effect on distance** between cyclists and parked cars on **heavy volume roads** than on moderate volume roads lane roads.
- Curb-lane width and time of day did not have a significant effect on how much the markings changed behavior.

Table 4 summarizes the findings of each of the markings.

Table 4. Summary Comparison of Markings

Study Issues	Bike-in-House	Bike-and-Chevron
1. Did the marking increase the distance of bicyclists from adjacent parked cars?	YES	YES
2. Did the marking increase the distance between passing motorists and cyclists?	YES	YES
3. Did the marking reduce observable hostile behaviors?	UNDETERMINED [1]	UNDETERMINED [1]
4. Did the marking reduce incidences of sidewalk riding?	YES	YES
5. Did the marking reduce incidences of wrong-way riding?	NO	YES

[1] There were too few incidents to reach a statistical conclusion.

Cyclist and Driver Survey Results

Staff and volunteers surveyed 103 San Francisco cyclists and 23 motorists about the bicycle markings at three locations: Polk Street, 2nd Street, and Market Street*. Approximately equal numbers of surveys were collected for both kinds of markings (see Table 5).

Table 5. Surveys Completed

Location	Marking Type				Sub-Totals		Totals
	Chevron		Bike-in-House				
	Cyclists	Drivers	Cyclists	Drivers	Chevron	Bike-in-House	
Market St.	20	--	45	--	20	45	**65**
Polk St.	7	11	8	12	18	20	**38**
2nd St.	23	--	0	--	23	0	**23**
Totals	**50**	**11**	**53**	**12**	**61**	**65**	**126[1]**

[1] While the grand total of cyclists surveyed is 128, two cyclist surveys returned did not include location or marking type information, and thus are not included in this chart.

The survey queried bicyclists' and drivers' understanding and perception of the markings. The results were coded in Microsoft Excel and analyzed using SPSS Statistical Software. Complete results are on file with the San Francisco DPT Bicycle Program.

In summary, the bicyclists surveyed see the markings as a step in the right direction and felt that the markings increased their sense of safety. However, the intended message of the markings was not fully understood. This could be remedied through a public information campaign.

The majority of the drivers surveyed claimed not to notice the markings. Since the sample size of drivers was so small, the results do not provide conclusive findings. Of the drivers that noticed the markings, there was no significant advantage of one marking over the other, but the drivers did not seem to confuse the markings with bike lanes.

* Surveys were administered roughly a half-block "downstream" of the markings during weekday peak travel times. The surveyors asked approaching cyclists if they would fill out the surveys on the spot (no surveys were mailed). Small warning signs (with the words, "Bike Surveys") were placed about 50 feet before the surveyors. About 25% of passing cyclists filled out the survey, which took an average of three to four minutes to complete. Drivers were surveyed as they arrived to their respective destinations along Polk Street.

Location and Rider Characteristics

Since most of the surveys were conducted on major commute routes during peak times, recreational and beginner cyclists are under-represented. Practically all of the interviewed cyclists categorized themselves as either intermediate (25%) or advanced (74%) urban cyclists. Typically, these cyclists are more likely to "take the lane" in urban traffic situations. Most of the cyclists were commuting to/from work (63%) or riding for utilitarian purposes (25%). Practically all of the cyclists were between the ages of 19-60 (60% 19-35 years old, 38% 36-60 years old).

Message

- Many cyclists believed that the markings indicated that the right lane served as a bike route or lane or that bikes have priority (30%) (see Figure 7).
- About 15% of cyclists felt that the marking indicated that bicyclists were allowed full use of the travel lane. 75% of these "take the lane" respondents had ridden over the bike-in-house marking.
- A few cyclists thought that the marking signified that a bike lane would be installed at the location in the future (2%).
- Of the motorists that responded, two out of the seven that noticed the markings understood that the marking indicate that they should allow more room for cyclists.

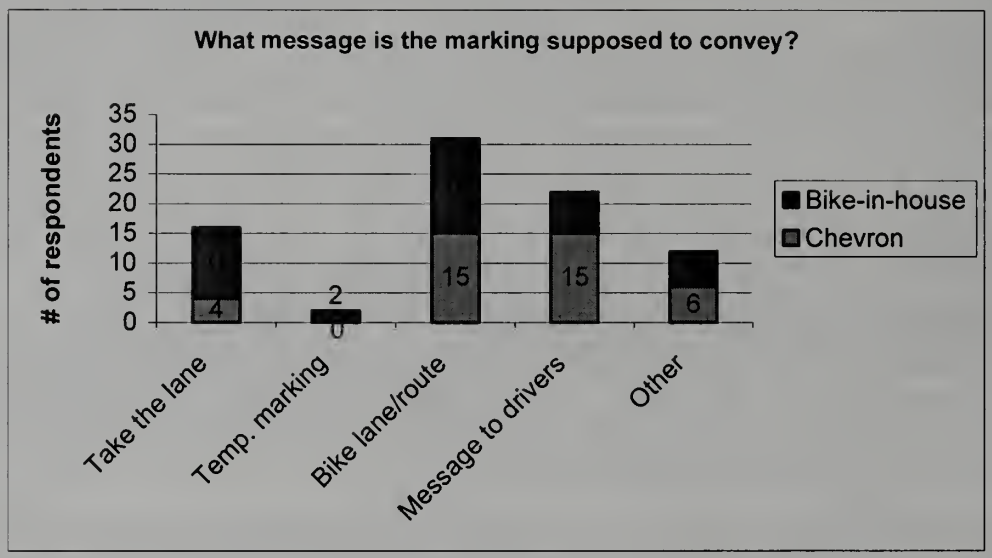


Figure 7. Cyclists' Responses to Survey - Message

Perception of Impact on Behavior

- Of the riders who noticed the markings, 33% felt that they did not change their position.
- Of the 33% of cyclists that felt that the marking affected their position (See Figure 8), 100% said that they rode closer to the center of the lane, often over the center of the marking.
- 60% of cyclists felt that the markings increased their sense of safety (See Figure 9).
- 35% felt that the marking improved driver behavior, 36% felt that the marking had no impact on driver behavior, and 29% were unsure (See Figure 10).
- One-third of drivers felt that the markings improved their behavior.

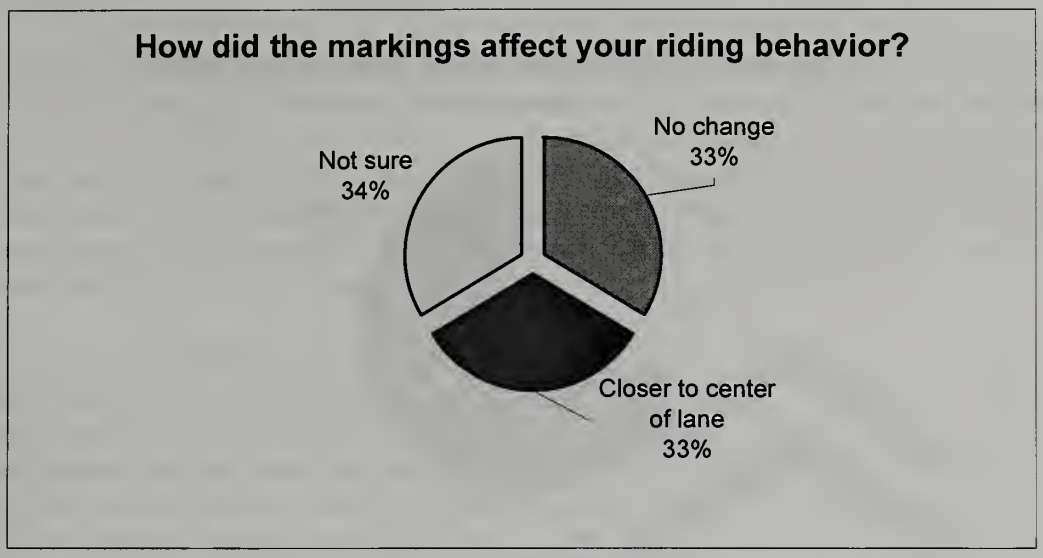


Figure 8. Cyclists' Responses to Survey - Riding Behavior

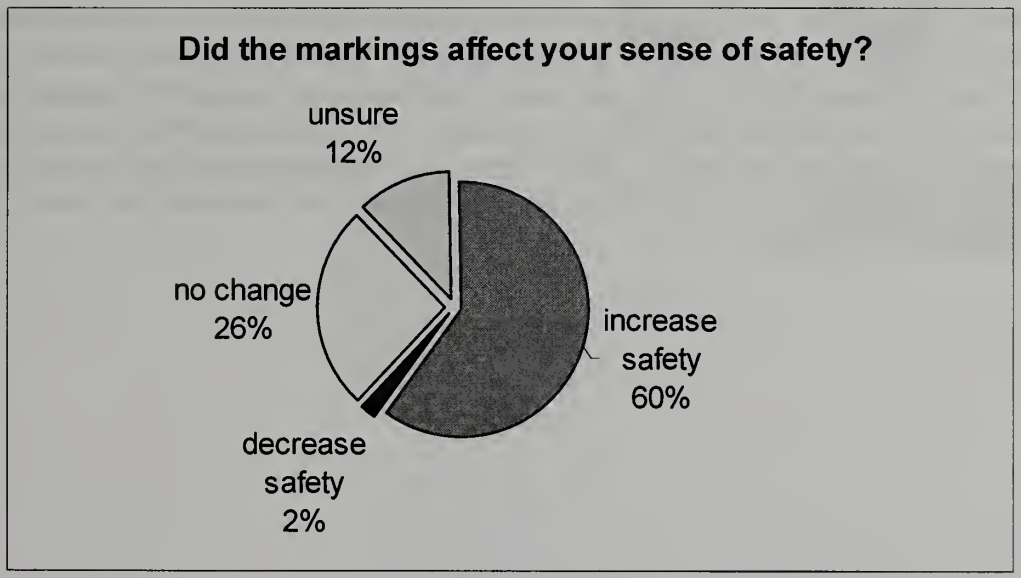


Figure 9. Cyclists' Responses to Survey - Sense of Safety

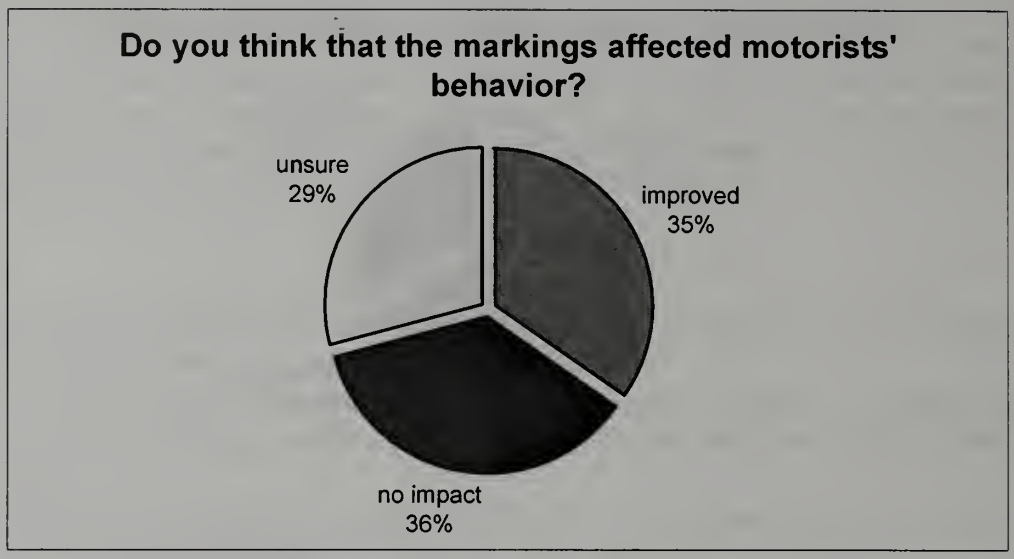


Figure 10. Cyclists' Responses to Survey - Motorists' Behavior

Visibility

- Of the 105 surveyed cyclists, 76 (72%) noticed the markings. About the same percentage of cyclists noticed each of the markings. When prompted, cyclists preferred the bike-and-chevron marking over the bike-in-house marking by a two to one ratio.
- Many cyclists also commented that the large, white markings are more visible and preferable to the green bike-in-house markings painted on San Francisco streets in the past.
- Of the 23 motorists that were surveyed on Polk Street, only seven (30%) noticed the markings. None of the respondents mentioned a preference for either marking. It should be noted that from the perspective of the driver, the chevrons appear "flat." Several cyclists made this comment as well. Many of the motorists felt that there was not enough room for cyclists on Polk Street.

Conclusion

This research has proven that shared lane pavement markings in San Francisco have a positive impact on motorist and cyclist behavior, positions, and safety. These results are complementary to a 1999 Florida study (Florida Department of Transportation, *Evaluation of the Shared-Use Arrow*). While both studies found that such markings significantly reduce wrong-way and sidewalk riding, the Florida study found a much smaller impact on cyclists' positions. In contrast to San Francisco, the Florida study measured rider positions on roadways with no on-street parking, and on streets where cyclists were less likely to "take the lane".

The bike-and-chevron marking had a stronger impact on motorist positioning and in reducing wrong-way riding and is preferred by cyclists surveyed. **Based on these findings, the project team recommends the bike-and-chevron marking be used as a standard marking for shared-use lanes on appropriate streets in San Francisco.** Based on comments received, the pitch of the chevron should be increased by approximately 6 inches (see Figure 11.) The project team also recommends that the California Traffic Control Devices Committee adopt this marking as an optional marking for Class III bikeways throughout California.

It should be noted, however, that this study did not analyze shared lane markings as a direct substitute for bicycle lanes, and therefore does not recommend that shared lane markings be used as a substitute for bicycle lanes where they are a feasible option.

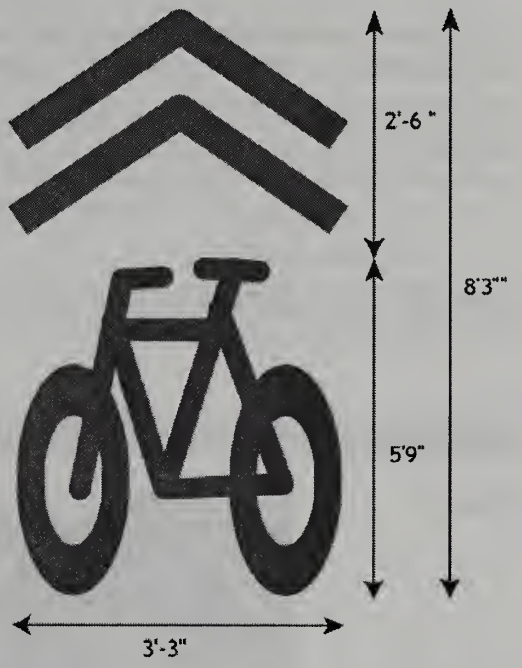


Figure 11. Recommended Modified Bike-and-Chevron

Appendix A: Pavement Markings in Other Cities

Various symbols have been tried by cities in the U.S., Europe and Australia. The symbols have been installed where bike lanes cannot be installed for various reasons including:

- Not enough cyclists;
- Too expensive;
- Requires loss of parking; and/or
- Requires road widening or other unacceptable trade-off.

To better understand these bicycle pavement symbol efforts, staff gathered information regarding (a) their use, (b) their effectiveness, (c) preferred installation locations, and (d) types of material, size, and color used. This report is a summary of the information gathered from:

- Brisbane, Australia
- Chicago, Illinois
- Oakland, California
- Denver, Colorado
- Cambridge, Massachusetts
- Paris, France
- Portland, Oregon
- Gainesville, Florida
- Warren and Waitsfield, Vermont
- Las Vegas, Nevada.

Location:	**Brisbane, Australia**
Photo:	
Size/Shape:	The idea is derived from the 4'0" wide Denver arrow, but instead Brisbane adopted a 1200-1500 mm wide yellow bicycle symbol as shown above.
Color:	Yellow (was considered an advisory color; distinguishable from the mandatory white bike lane symbols also in use)
Material:	Paint
Source:	Michael Yeates, Convener, Cyclists Urban Speed limit Taskforce, An initiative of the Bicycle Federation of Australia Inc ph +61 7 3371 9355, michaelm@myoffice.net.au , www.yeatesit.biz/transfiles/bfaurbanspeedlimits.pdf
Other Sources:	Bicycle Federation of Australia. Associated report "Towards A Safe Urban Speed Limit: Report Of The Cyclists Urban Speed Limit Task Force": www.bfa.asn.au/cyclist/201speed.htm City of Brisbane, Australia. "Making Space For Cyclists By Sharing The Road: Brisbane City Council's "Bicycle Friendly Zone" report: www.brisbane.qld.gov.au/getting_around/bikes/bikeways/signs.shtml www.ourbrisbane.com/brisbane/traffictrans/bicycles.htm
How Used:	A yellow bike symbol system has been under development on Brisbane streets since 1995. They are called Bicycle Friendly Zones (BFZ). On existing roads where there is not enough space to provide a bike lane, BFZs are created to alert motorists of "the likely travel corridor for bicyclists". These zones are marked with a yellow bicycle symbol that warns other road users that cyclists commonly use the route. The intention is to clearly delineate the parking

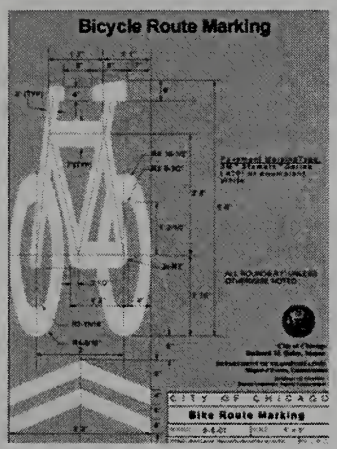
areas so that the areas between the parked vehicles and the through traffic can be utilized by cyclists. The reduced speed (50km/h) and the bike symbols show where cyclists are expected. The yellow symbols are placed (using standard road-marking stencils) 1800-2000 mm from the curb where parking is allowed, and closer to the curb where there is no parking. On single lane roads where edge lines are installed, the lines are regularly broken to accommodate the yellow bike symbols (see photo). In all cases, the symbols are repeated at regular intervals on the road.

According to the Bicycle Federation of Australia, the major benefit of the BFZ is adaptability. It can be used to "make room for the cyclists" in combinations of lower speed areas in areas such as shopping strips to reduce traffic speed by integrating all relevant urban design elements. Used in various combinations, it preserves space for cyclists without "separation", an example of "sharing the road". From a technical perspective, correct placement of the BFZ allows its use on roads that, if bike lanes were used, would require widening traffic lanes that, according to traffic design theory, results in increased speed of the adjoining traffic. The development and use of the BFZ illustrates the relationship between speed limits, speeding, perceptions of safety and provision of facilities. Despite not being able to reduce the speed limit on main roads from 60 to 50km/h, reduced traffic speeds when cyclists are present have been achieved by use of the BFZ.

Effectiveness: Brisbane's use of the bike symbols has been an ongoing "trial" without any specific evaluation processes. To see if the concept worked intuitively or subjectively, no education was provided before or after the installation of the symbols. Michael Yates believes that they appear to be working intuitively and no negative effects have been identified.

Location: **Chicago, Illinois**

Photo:



Size/ Shape: 5' 9" high by 3' 3" wide bicycle above 1' 8" high by 3' 3" wide double chevron. Randy Neufeld modeled it after a design photographed in Paris a couple of years ago by a Chicagoland Bicycle Federation member. (Bike-in-House symbols previously installed in 1999 were considered too small to be understood by cyclists.)

Color: White

Material: They upgraded their symbols to an intersection grade quality material in 2002. In general, their 3M thermoplastic symbols have lasted 5 years or more, depending on wear.

Source: Nick Jackson, Director of Planning, Chicagoland Bicycle Federation
(312) 427-3325 x 27, nick@biketraffic.org

How Used: The symbol has been used by the Chicago DOT Bike Program in two places for shared lanes, both short connections between bike lanes. It is also planned for use in conjunction with directional signage to lead cyclists across large intersections to a facility in an area where many cyclists ride on the sidewalk.

Effectiveness: unknown at this time

Location: **Oakland, California**

Photo: Not available

Size/ Shape: Not available

Color:	White
Material:	Paint
Source:	Kathryn Hughes, City of Oakland Public Works Agency, Transportation Services Division ph 510-238-6493, khughes@oaklandnet.com
How Used:	White bike stencils were placed on a shared-use connecting link between two bike lanes on Grand Avenue in Oakland. The project is called the Grand Avenue Commuter Bikeway. The bike lanes extend from El Embarcadero to Webster, then the stencils/shared lane from Webster to Broadway, and bike lanes from Broadway to Market. SG 45 signs were also installed on the entire route and Share the Road signs on the stenciled portion.
Effectiveness:	unknown at this time

Location: **Denver, Colorado**

Photo:

Size/ Shape:	Bike-in-a-house design (the original, designed by James Mackay), 4' 3" long x 4' 0" wide, with a left-bound cyclist
Color:	White
Material:	One of the reasons for the "Bike in the House" symbol was to reinforce the correct direction of travel. Additionally, there was a desire to reduce the typical pavement marking costs of bike lanes. The original symbols were painted, but since the paint abraded away quickly from winter sanding operations, they have been replaced with thermoplastic solid outlined symbols as shown above (cost is $50 each).
Source:	James Mackay, P.E., Denver Bicycle Planner, 201 West Colfax Avenue, Department 509, Denver, CO 80202, ph 720-865-3171, fax 720-865-2676, James.Mackay@ci.denver.co.us http://www.denvergov.org/Bicycle_Program/59810116template3jump.asp
How Used:	As part of Denver's 1993 Bicycle Master Plan development, a "Shared Use Lane Pavement Marking Arrow", commonly called the "Bike in the House", was designed. The symbols are used in shared use lane conditions where bike lanes are not provided, but where it is desired to define the likely travel corridor for bicyclists. Symbols are placed approximately every 180 feet on-center along roads, often with "Share the Road" signs. They are placed so the center of the arrow is 9' 6" off the curb line with an adjoining 7 foot parking stall.
Effectiveness:	Not available

Location: **Cambridge, Massachusetts**

Photo:

Size/ Shape:	Bicycle stencil placed in a break of a continuous white line
Color:	White

Material:	Paint
Source:	Cara Seiderman, cseiderman@Spike.CI.Cambridge.MA.US Wayne Amaral, Cambridge Traffic Department, (617) 349-4723 Bryce Nesbitt, Bicycle Committee member, bryce2@obviously.com
How Used:	Pavement markings have been installed on Mt. Auburn Street in Cambridge. The travel lane is 11 feet and the guideline is 10' out from the curb.
Effectiveness:	No formal study completed yet, but these comments were passed on: "I find this lane treatment highly appropriate for intermediate width streets (too narrow for a full bike lane, too wide for cyclists to take the entire lane). In particular I find: "1. It seems to keep cyclists out of the door zone. Cyclists ride within inches of the line. "2. Motorists don't seem to get mad when a cyclist deviates from the line. With conventional double-stripe bike lanes, motorists often seem to insist that bikes stay within the bike lane. This does not happen on Mt. Auburn."
Location:	**Paris, France**
Photo:	
Size/ Shape:	Similar to the Chicago, IL symbol (5' 9" high by 3' 3" wide bicycle above 1' 8" high by 3' 3" wide double chevron)
Color:	White
Material:	Thermoplastic
Source:	Marc Jolicoeur, Research Coordinator, Velo Quebec tel.: (514) 521-8356 #394, fax: (514) 521-5711, marc_jolicoeur@velo.qc.ca
How Used:	The city of Paris is using arrows and bike symbols repeated along the line of travel of cyclists in intersections, about the same way colored lanes have been used in Portland and Montreal.
Effectiveness:	unknown at this time
Location:	**Portland, Oregon**
Photo:	
Size/ Shape:	Standard markings for inside bike lane
Color:	White
Material:	Thermoplastic
Source:	Mia Birk, Principal, Alta Planning + Design, 144 NE 28th Avenue, Portland OR 97232 ph (503) 230-9862, fax (503) 230-9864, cell (503) 238-4745, miabirk@altaplanning.com
How Used:	Portland used the bike lane marking without the bike lane line in one case in February 1998. This case involves a street with bike lanes that lead up to a 26' wide bridge, on which there is not adequate room for bike lanes. The city retained the marking on the outer 3' of each of the

13' lanes to encourage motorists to travel toward the left of the lane.

Effectiveness: No specific study. Anecdotal evidence suggests that motorists are indeed giving cyclists room: the markings are still there after almost five years of application and show little signs of motorists' driving on them.

Location: **Gainesville, Florida**

Photo:

Size/ Shape: bike-in-a-house, 4' 0" wide x 6' 0" long

Color: White

Material: Paint

Source: Dennis Scott, Florida Pedestrian and Bicycle Coordinator
ph (850) 410-4927, dennis.scott@dot.state.fl.us

How Used: Their shared-use arrow was intended to address deficiencies in wide outside curb lane bike facilities. The wide curb lanes are frequently not recognized as a facility by bicyclists. The shared-use arrow informs the cyclists about where to ride and in which direction. The symbols were put down as part of a November 1999 usage evaluation, performed by the University of North Carolina Highway Safety Research Center (HSRC), to compare the riding positions of bicyclists and the position of motorists on sections marked with the shared-use arrow to unmarked sections.
The arrow was placed by Gainesville Public Works at 3.5 feet from the curb face at four locations along 13th Street (US 441). In this study area, 13th Street has 4 lanes, a 30 mph speed limit, and carries approximately 35,000 vehicles per day. The four locations were examined using videotaping equipment to record bicycles and motor vehicles.

Effectiveness: For this evaluation, the measures of effectiveness pertained to before and after measurements of bicycles and motor vehicles from the curb and from each other. Bicycle to Curb was the only measurement that showed a statistically significant difference between the BEFORE and AFTER conditions. Although the difference between the BEFORE mean measurement of 1.58 feet and the AFTER of 1.83 feet was statistically significant, this .25 feet (1.83 - 1.58), or 3 inches, is not practically significant. This does not represent enough of a meaningful shift in distance for real world application. Furthermore, this amount may fall within the measurement error of the software/data reducer, especially considering that BEFORE measurements were made with the bicyclist farther from the camera. More trials in other locations are recommended and should result in more conclusive findings.

Location: **Warren and Waitsfield, Vermont**

Photo: Not available

Size/ Shape: Bike-in-a-house design (4' x 4' approximately – some maybe smaller due to narrow shoulders of 3' or less)

Color: White

Material: Paint

Source: Amy Bell, Vermont Bicycle and Pedestrian Coordinator, ph (802) 828-5799

How Used: Symbols were placed experimentally along the shoulders of a scenic tourist 4.5 mile stretch of US Route 100. Share the Road signs were installed with the pavement symbols. The symbols have not been replaced since their first application, and many are worn away, covered over or scraped off from winter equipment. The signs are still in place.

Effectiveness: No specific study. Casual verbal survey of approximately 200 local citizens and 50 bicyclists led to conclusion that bicyclists felt the symbols were too small to be effective and local drivers rarely noticed them. The Vermont DOT decided to not encourage their use, to not replace them, and to not include them in future plans

Location: **Las Vegas, Nevada**

Photo: Not available

Size/ Shape:	MUTCD standard bicyclist and arrow symbol
Color:	White
Material:	Retroreflective film with glass beads
Source:	Mike Colety, P.E., Kimley-Horn and Associates ph (702) 862-3609, fax (702) 735-4949, mike.colety@kimley-horn.com
How Used:	Pavement stencil markings are only used with bicycle lanes (not shared lanes
Effectiveness:	Not available

Location:	**Sacramento, California**
Photo:	Not available
Size/ Shape:	Not available
Color:	White
Material:	Paint
Source:	Ed Cox, Alternative Modes Coordinator, City of Sacramento, ph (916) 264-8434, fax (916) 264-8357, ecox@cityofsacramento.org
How Used:	For several years Sacramento has been using a painted arrow and legend that says "Bike Route". It is almost identical to markings used for bike lanes (Highway Design Manual figure 1004.3) that says "Bike Lane". Sacramento's symbols are used for streets that are on their Bikeway Master Plan, primarily on Class 3 routes where they are combined with the Green and White Bike Route signs (California State Department of Transportation, Caltrans, G93). They have also put them on streets where it was not possible to install Class 2 bike lanes.
Effectiveness:	No study. They do provide route guidance to bicyclists.

Other Locations

Freiburg, Germany

Buenos Aires, Argentina

San Anselmo, California

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